



United States Environmental Protection Agency  
Washington, DC 20460

## Completion Form For Injection Wells

### Administrative Information

**1. Permittee**

Florence Copper Inc.

**Address (Permanent Mailing Address) (Street, City, and ZIP Code)**

1575 W Hunt Hwy, Florence, AZ 85132

**2. Operator**

Florence Copper Inc.

**Address (Street, City, State and ZIP Code)**

1575 W Hunt Hwy, Florence, AZ 85132

**3. Facility Name**

Florence Copper Inc.

**Telephone Number**

(520) 374-3984

**Address (Street, City, State and ZIP Code)**

1575 W Hunt Hwy, Florence, AZ 85132

**4. Surface Location Description of Injection Well(s)**
**State**

Arizona

**County**

Pinal

**Surface Location Description**

SW 1/4 of  SW 1/4 of  NE 1/4 of  SW 1/4 of Section  28 Township  4S Range  9E

Locate well in two directions from nearest lines of quarter section and drilling unit

**Surface**

Location  1080 ft. frm (N/S)  N Line of quarter section  
and  1045 ft. from (E/W)  E Line of quarter section.

**Well Activity**

- Class I
- Class II
  - Brine Disposal
  - Enhanced Recovery
  - Hydrocarbon Storage
- Class III
- Other

**Well Status**

- Operating
- Modification/Conversion
- Proposed

**Type of Permit**

- Individual
- Area : Number of Wells  33

Lease Number  NA

Well Number  WB-04

*Submit with this Completion Form the attachments listed in Attachments for Completion Form.*

### Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment (Ref. 40 CFR 144.32)

Name and Official Title (Please type or print)

Ian Ream, Senior Hydrogeologist

Signature

Date Signed

*9-12-2018*

## **PAPERWORK REDUCTION ACT**

The public reporting and record keeping burden for this collection of information is estimated to average 49 hours per response for a Class I hazardous facility, and 47 hours per response for a Class I non-hazardous facility. Burden means the total time, effort, or financial resource expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal Agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to the collection of information; search data sources; complete and review the collection of information; and, transmit or otherwise disclose the information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including the use of automated collection techniques to Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed forms to this address.

### **Attachments to be submitted with the Completion report:**

#### **I. Geologic Information**

##### **1. Lithology and Stratigraphy**

A. Provide a geologic description of the rock units penetrated by name, age, depth, thickness, and lithology of each rock unit penetrated.

B. Provide a description of the injection unit.

- (1) Name
- (2) Depth (drilled)
- (3) Thickness
- (4) Formation fluid pressure
- (5) Age of unit
- (6) Porosity (avg.)
- (7) Permeability
- (8) Bottom hole temperature
- (9) Lithology
- (10) Bottom hold pressure
- (11) Fracture pressure

C. Provide chemical characteristics of formation fluid (attach chemical analysis).

D. Provide a description of freshwater aquifers.

- (1) Depth to base of fresh water (less than 10,000 mg/l TDS).
- (2) Provide a geologic description of aquifer units with name, age, depth, thickness, lithology, and average total dissolved solids.

#### **II. Well Design and Construction**

- 1. Provide data on surface, intermediate, and long string casing and tubing. Data must include material, size, weight, grade, and depth set.
- 2. Provide data on the well cement, such as type/class, additives, amount, and method of emplacement.
- 3. Provide packer data on the packer (if used) such as type, name and model, setting depth, and type of annular fluid used.

4. Provide data on centralizers to include number, type and depth.

5. Provide data on bottom hole completions.

6. Provide data on well stimulation used.

#### **III. Description of Surface Equipment**

1. Provide data and a sketch of holding tanks, flow lines, filters, and injection pump.

#### **IV. Monitoring Systems**

1. Provide data on recording and nonrecording injection pressure gauges, casing-tubing annulus pressure gauges, injection rate meters, temperature meters, and other meters or gauges.

2. Provide data on constructed monitor wells such as location, depth, casing diameter, method of cementing, etc.

#### **V. Logging and Testing Results**

Provide a descriptive report interpreting the results of geophysical logs and other tests. Include a description and data on deviation checks run during drilling.

**VI.** Provide an as-built diagrammatic sketch of the injection well(s) showing casing, cement, tubing, packer, etc., with proper setting depths. The sketch should include well head and gauges.

**VII.** Provide data demonstrating mechanical integrity pursuant to 40 CFR 146.08.

**VIII.** Report on the compatibility of injected wastes with fluids and minerals in both the injection zone and the confining zone.

**IX.** Report the status of corrective action on defective wells in the area of review.

**X.** Include the anticipated maximum pressure and flow rate at which injection will operate.

**TECHNICAL MEMORANDUM**

14 September 2018

File No. 129687-010

TO: Florence Copper Inc.  
Ian Ream, Senior Hydrogeologist

FROM: Haley & Aldrich, Inc.  
Lauren Candreva, R.G.

Subject: Drilling, Installation, and Integrity Testing Summary  
PTF Westbay Well WB-04  
Florence Copper Inc., Florence, Arizona



This document summarizes the drilling, installation, and testing of Production Test Facility (PTF) Westbay well WB-04 for Florence Copper Inc. (Florence Copper) in Florence, Arizona, including the equipment used to perform the work, completion, and the results of well testing activities. Separate well completion reports have been created for each PTF well.

The Arizona Department of Water Resources Registry ID for well WB-04 is 55-227229 and the Well Registry Report is included in Appendix A. The well is located in the southwest quarter of the northeast quarter of the southwest quarter of Section 28 of Township 4 north, Range 9 East of the Gila and Salt River Baseline and Meridian (D(4-9)28CAC). The well is located within the Underground Injection Control (UIC) Permitted Area of Review (AOR) for UIC Permit R9UIC-AZ3-FY11-1 and was completed as a Class III multi-level monitoring well for the PTF (Figure 1).

Florence Copper contracted Hydro Resources, Inc. (Hydro Resources) to drill, install, and test well WB-04 in accordance with *Bid Specification: Drilling, Installation, and Testing of Class III Westbay Wells, Production Test Facility, Florence, Arizona* (Haley & Aldrich, Inc. [Haley & Aldrich], 2017). A Midway 3500 drilling rig was used for all drilling and construction activities. Haley & Aldrich provided oversight of drilling activities, geophysical logging, well installation, and testing. All reported depths are in feet below ground surface unless otherwise noted.

## I. Geologic Information

### 1. Lithology and Stratigraphy

#### A. Geology of Penetrated Units

The geology penetrated during the drilling of the Class III well WB-04 is summarized below and a lithologic log is included in Appendix B.

Lithologic Unit Name	Depth to Bottom of Unit (feet)	Thickness of Unit (feet)	Lithology and Age of Unit
Upper Basin Fill Unit (UBFU)	280	280	Alluvium; Quaternary to Tertiary
Middle Fine-Grained Unit (MFGU)	300	20	Alluvium; Tertiary
Lower Basin Fill Unit (LBFU)	375	75	Alluvium; Tertiary to Cretaceous
Bedrock Oxide Unit (Oxide)	Not encountered	>844	Igneous porphyry; Precambrian

#### B. Description of Injection Unit

Name	Bedrock Oxide Unit
Depth drilled	1,219 feet
Thickness	>844 feet
Formation fluid pressure	Atmospheric plus head of freshwater; no additional formation pressure
Age of unit	Precambrian with intrusions of Precambrian to Tertiary rocks
Porosity <sup>1</sup>	Approximately 6 to 8.5%
Permeability	Hydraulic conductivity = 0.56 feet per day
Bottom hole temperature	27.6 degrees Celsius
Lithology	Igneous porphyry: quartz monzonite, granodiorite with diabase and andesite dykes (detailed log included in Appendix B)
Bottom hole pressure	Approximately 410 pounds per square inch (PSI) (pressure exerted by the column of freshwater with no additional contribution from formation pressure)
Fracture pressure	0.65 PSI per foot

<sup>1</sup> Porosity values for the bedrock oxide unit are approximate values from calculated neutron porosity values from injection well borehole surveys.

### C. Chemical Characteristics of Formation Fluid

The chemical characteristics of the formation fluid in the injection zone are summarized below and are the sampling results from the center PTF wellfield well, R-09. The table below summarizes the primary chemical characteristics detected in a formation fluid sample collected on 23 April 2018; the complete analytical report is included in Appendix C.

Analyte	Result (mg/L)
<b>Metals</b>	
Aluminum	<0.08
Antimony	<0.005
Arsenic	0.0016
Barium	0.071
Beryllium	<0.0005
Cadmium	<0.00025
Calcium	140
Chromium	0.0051
Cobalt	<0.00025
Copper	0.011
Iron	<0.30
Lead	<0.0005
Magnesium	27
Manganese	0.002
Mercury	<0.001
Nickel	0.0033
Potassium	6.8
Selenium	<0.0025
Sodium	170
Thallium	<0.0005
Zinc	<0.04
<b>Anions</b>	
Bicarbonate	150
Chloride	310
Fluoride	<0.5
Nitrate	8.8
Sulfate	190
<b>Field Parameters</b>	
Total Dissolved Solids	1,000
pH	7.8
<b>Radiochemicals</b>	
Uranium	0.016
<b>Notes:</b> <i>mg/L = milligrams per liter</i>	

Results of the sampling of well WB-04 are included in the *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings* (Brown and Caldwell, 2018).

D. Description of Freshwater Aquifers

- 1) The depth to the base of the freshwater aquifer is defined by the interface where deeper formation fluid exhibits a total dissolved solids (TDS) value of 10,000 milligrams per liter (mg/L). The depth of the 10,000 mg/L interface is deeper than all of the wells drilled at the site and consequently has not been defined.
- 2) The geologic description of the aquifer units is included below:

Aquifer Unit Name	Age	Depth (feet)	Thickness (feet)	Lithology	Average Total Dissolved Solids <sup>1</sup> (mg/L)
UBFU	Quaternary/Tertiary	0 to 280	280	Alluvium	914
LBFU	Tertiary	300 to 375	75	Alluvium	754

<sup>1</sup> Average TDS values calculated from UBFU and LBFU monitoring well ambient monitoring results near the PTF.

## II. Well Design and Construction

### 1. Well WB-04 Casing Installed

Casing	Material	Diameter (inches)	Weight (pounds per foot)	Depth (feet)	Borehole Diameter (inches)	Drilling Method
Surface	Mild steel	14 O.D. 13 $\frac{3}{8}$ I.D.	47.36	0 to 40	20	Solid-stem auger
Well casing	FRP	4.5 O.D. 3.75 I.D.	3.54	-2.0 to 500	12 $\frac{1}{4}$	Reverse flooded rotary
Screen	PVC Sch. 80 with 0.020-inch wide slots	4.5 O.D. 3.83 I.D.	2.78	564 to 574 704 to 714 844 to 854 984 to 995 1,125 to 1,135	12 $\frac{1}{4}$	Reverse flooded rotary
Blank intervals	PVC Sch. 80	4.5 O.D. 3.83 I.D.	2.78	500 to 563 574 to 704 714 to 844 854 to 984 995 to 1,125 1,135 to 1,175	12 $\frac{1}{4}$	Reverse flooded rotary

**Notes:**  
FRP = fiberglass-reinforced plastic  
I.D. = inside diameter  
O.D. = outside diameter

PVC = polyvinyl chloride  
Sch. = Schedule

## 2. Well Cement

Cement Interval	Cement Type	Additives	Amount Installed (cubic yards)	Method of Emplacement
Surface casing	Type V Neat 21 sack slurry	None	7	Submerged tremie
Well casing	Type V Neat 21 sack slurry	None	29.1	Submerged tremie

Field forms documenting pipe tallies, annular materials, and cement tickets are included in Appendix D.

## 3. Annular Packers

No annular packers were used during construction of well WB-04.

## 4. Centralizers

Casing	Centralizer Type	Number and Spacing
Well – FRP and PVC	Stainless steel – heavy duty	30 installed – every 40 feet

**Notes:**

FRP = *fiberglass reinforced plastic*

PVC = *polyvinyl chloride*

## 5. Bottom Hole Completion

There is no bottom hole completion, as this is not an oil/gas well. The well was completed at the bottom with a stainless-steel endcap of the same diameter as the well screen.

## 6. Well Stimulation

No well stimulation was used during the drilling and construction of well WB-04.

## III. Description of Surface Equipment

### 1. Surface Equipment

Well WB-04 is a multi-level sampling well and has been equipped with a discrete multi-level sampling system designed and installed by Westbay Instruments. The wellhead has been equipped with a well seal; the Westbay tubing extends from the well seal and is capped when not in use.

## IV. Monitoring Systems

### 1. Well Monitoring Equipment

Equipment Type	Location	Type	Purpose
Annular Conductivity Sensors	Well annulus	Non-recording	Monitor formation conductivity

### 2. Monitoring Wells

A total of 16 monitoring wells are associated with the PTF: 7 point-of-compliance (POC) wells, 7 United States Environmental Protection Agency (USEPA) supplemental monitoring wells, and 2 operational monitoring wells. The POC wells are located outside the AOR and are not constructed as Class III wells; the supplemental monitoring and operational monitoring wells are located within the AOR and are constructed as Class III wells as required by the UIC Permit. The wells are summarized in the tables below by type.

POC Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M14-GL	846750.23 746461.52	859	5 9/16 OD	Submerged tremie	778 to 838	LBFU
M15-GU	846697.17 746464.82	615	5 9/16 OD	Submerged tremie	554 to 594	LBFU
M22-O	846751.26 746514.47	1,140	5 9/16 OD to 528 feet; 4 1/2 OD to 1,140 feet	Submerged tremie	932 to 1,130	Oxide
M23-UBF	846688.13 746512.48	250	6 5/8 OD	Submerged tremie	210 to 250	UBFU
M52-UBF	851092.00 774178.00	274	5 9/16	Submerged tremie	198 to 273	UBFU
M54-LBF	847331.96 746682.61	630	5 9/16	Submerged tremie	310 to 629	LBFU
M54-O	847342.99 746702.36	1,199	5 9/16	Submerged tremie	668 to 1,198	Oxide

OD = outside diameter

Supplemental Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval (feet)	Screened Lithologic Unit
M55-UBF	847541.46 746280.63	261	5	Submerged tremie	240 to 260	UBFU
M56-LBF	847518.70 746303.41	340	5	Submerged tremie	320 to 340	LBFU
M57-O	847378.37 746248.93	1,200	5	Submerged tremie	523 to 1,199	Oxide
M58-O	847672.23 746595.97	1,200	5	Submerged tremie	594 to 1,199	Oxide
M59-O	847934.95 746218.89	1,201	5	Submerged tremie	534 to 1,199	Oxide
M60-O	847599.37 745903.70	1,201	5	Submerged tremie	444 to 1,200	Oxide
M61-LBF	848184.46 746148.88	629	5	Submerged tremie	429 to 629	LBFU

Operational Monitoring Wells						
Well ID	Location X/Y (State Plane NAD 83)	Depth (feet)	Well Nom. Diameter (inches)	Cementing Method	Screened Interval	Screened Lithologic Unit
MW-01-LBF	847487.97 746360.54	444	5	Submerged tremie	330 to 440	LBFU
MW-01-O	847499.04 746369.31	1,200	5	Submerged tremie	500 to 1,200	Oxide

## V. Logging and Testing Results

Borehole geophysical logging was conducted on well WB-04 in two phases: 1) open-hole surveys in the 12.25-inch borehole prior to installation of the well casing and screen, and 2) cased-hole surveys in the completed well.

The open-hole geophysical surveys completed at well WB-04 included:

- Spontaneous potential;
- Natural gamma;
- Electrical resistivity (short and long normal);
- Caliper with calculated volume;

- Temperature;
- Sonic; and
- Deviation.

The cased-hole geophysical surveys completed included:

- Sonic (for cement bond with fiberglass reinforced plastic [FRP]);
- 4 pi density (for cement bond with FRP);
- Dual density (for cement bond with FRP);
- Natural gamma;
- Fluid conductivity;
- Temperature;
- Gyroscopic deviation survey; and
- Video survey.

Open-hole geophysical surveys were used to support identification of the lithologic contacts, to evaluate the condition of the borehole, and to evaluate the deviation of the borehole.

The primary logs used to evaluate lithologic contacts were natural gamma ray, short (16-inch) and long (64-inch) normal electrical resistance, and single-point resistance.

The lithologic contacts for the Middle Fine-Grained Unit (MFGU) were selected based on the short and long resistance and the single-point resistance. All the resistivity values decreased and remained consistently low through the MFGU. This contact is generally characterized by a relatively sharp decrease in resistance at the top of the unit and a gradual increase in resistance below the bottom of the unit.

The contact between the Lower Basin Fill Unit (LBFU) and the bedrock was identified primarily using the natural gamma and correlated with the resistance logs. There is a consistent increase in gamma values at the contact between the LBFU and the bedrock that was identified and documented at the site during exploration in the 1990s. For well WB-04, the gamma values are consistent at approximately 60 American Petroleum Institute (API) units throughout the Upper Basin Fill Unit (UBFU) and MFGU, increase slightly to approximately 80 API units in the LBFU, and then increase at approximately 375 feet to over 120 API units. After the increase at 375 feet, the natural gamma begins to vary more than in the alluvial units. This change in the response of the natural gamma indicates the contact with the bedrock unit. Also, at this approximate depth, there is an increase in the single-point and the short normal resistance, indicating that the formation has become more resistant. This feature likely occurs primarily because the bedrock contains less water than the alluvial formation above.

Cased-hole geophysical surveys were conducted to evaluate the cement seal and the casing-cement bond, to document baseline fluid temperature and conductivity, and to evaluate the plumbness of the well. The cement bond is discussed in Section VII.

Copies of all the open-hole geophysical logs and cased-hole temperature, fluid conductivity, and natural gamma are included in Appendix E; a figure summarizing the open-hole logs used to evaluate the geology is included as Figure 3. The cased-hole logs used to evaluate the cement bond are included in Appendix F.

## **VI. Well As-Built Diagram**

An as-built diagram for well WB-04 is included as Figure 2.

## **VII. Demonstration of Mechanical Integrity**

A demonstration of Part I mechanical integrity of the well was completed using a standard annular pressure test (SAPT) in accordance with Part II.E.3.a.i.A of the UIC Permit. Mechanical integrity will be demonstrated every 2 years during operations and will be confirmed by daily injection pressure monitoring that will be conducted per the UIC Permit once the well is operational. The SAPT for Well WB-04 is summarized below.

The SAPT was conducted by installing an inflatable straddle packer assembly in the well. The bottom packer was installed near the bottom of the FRP-cased portion of the well, the top packer was near the surface, the packers were inflated to form a seal against the casing. The bottom 5 feet of the packer drop pipe was perforated to allow for communication between the tubing and the annulus of the packer assembly. The drop pipe extended through the wellhead and a high pressure/low volume pump was attached to the drop pipe to pressurize the test interval. A valve on the drop pipe at the surface was used to isolate the test interval once the planned test pressure was achieved.

An In-Situ LevelTROLL® pressure transducer with a data logger was installed at the well head and was connected to the packer assembly annulus interval via a National Pipe Thread adapter. The LevelTROLL was used to monitor and record pressure inside the well during the SAPT. To conduct the SAPT, water was pumped from a nearby well immediately prior to testing. Before the water was pumped into the test well, the water temperature was measured to ensure that it was similar to the ambient groundwater temperature of the test well to reduce the potential of differential temperature effects on the well casing. The SAPT for the Class III well was conducted by applying hydraulic pressure to the well casing and shutting in pressure between the packer and wellhead assembly, monitoring the shut-in pressure for a 30-minute period, then measuring the volume of water returned from the well casing after the pressure was released.

On 7 April 2018, the packer was installed to approximately 483 feet and the SAPT was conducted successfully two times. The USEPA SAPT form, a table of the data, and a chart of the data is provided in Appendix G.

Part II mechanical integrity is demonstrated by the cementing records included in this report (in accordance with Part II.E.3.ii.C of the UIC Permit) and will be demonstrated during operations by annular conductivity monitoring on the observation and multi-level sampling wells (in accordance with Part II.E.3.a.ii.A of the UIC Permit).

Cemented Interval	Cement Type	Calculated Grout Volume (cubic yards)	Installed Grout Volume (cubic yards)
Surface Casing	Type V 21 sack neat cement slurry	3.1	7
Well Casing	Type V 21 sack neat cement slurry	26	29.1

On 6 April 2018, a suite of geophysical logs was run over the entire length of the completed well to verify the grout seal. A summary of the logs completed to demonstrate cement bond are included in Appendix F.

There is not a bond log tool designed to evaluate cement bond with FRP casing, so the cement interval with FRP casing of WB-04 was evaluated using density logs. The logs collected included sonic, focused density, and 4pi density. Based on the measured density of the FRP cased interval of WB-04, no significant cement deficiencies were noted in the sonic data collected from approximately 247 feet (static water level) to 489 feet, and no significant deficiencies were noted in the 4pi density data collected from 40 to 489 feet. There were some very localized, low density intervals identified in the 4pi density logs but they were insignificant, only extending 2 to 3 feet. A summary of the FRP cased data is included in the well completion summary in Appendix F.

## VIII. Compatibility of Injected Waste

The Florence Copper Project is a Class III mineral extraction project and does not include the injection of any waste products of any kind. The injected fluid (lixiviant) is a carefully constituted in-situ copper recovery solution that will be recovered and recycled following injection.

The compatibility of the lixiviant was evaluated as part of the geochemical modeling completed by Florence Copper and summarized in the *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona* (Daniel B. Stephens Inc., 2014) which was included in Attachment H of the UIC Permit Application.

## **IX. Status of Corrective Action on Defective Wells in the Area of Review**

There are not currently any defective wells in the AOR.

## **X. Maximum Pressures and Flow Rates for WB-04**

Maximum Operating Pressure	Maximum Flow
Atmospheric	Not applicable – sampling well

This well is a multi-level sampling well used to monitor migration of mining solution in the formation. No fluids will be injected, and only small volumes of fluid will be extracted to evaluate solution in the formation; extraction will use Westbay sampling equipment.

## **XI. Well Development**

Well WB-04 was initially developed by the airlift method, followed by pumping. Development activities were completed by Hydro Resources using a workover rig. To purge drilling fluids and solids, the well was airlift developed on 1 and 2 April 2018 at various depths. During development, the airlift pump was turned on and off to surge the well. On 3 April 2018, approximately 33 gallons of chlorine were added to the well.

To pump develop the well, a submersible pump was temporarily installed at approximately 1,100 feet on 03 April 2018. Pump development was conducted at 14 gallons per minute from 3 to 5 April 2018, during which time the submersible pump was raised to 550 feet and periodically turned off to surge the well. Turbidity values were generally less than 10 Nephelometric Turbidity Units at the end of the development period. Well development forms are included in Appendix H.

## **XII. Well Completion**

A well video survey was conducted on 6 April 2018; the video log report is included in Appendix I. The video log depths are presented in feet below the top of the casing and thus vary slightly from what is recorded; however, these values are the same with the correction for stick up.

The video log indicates that the bottom of the well casing is at 1,174 feet.

A gyroscopic survey was also conducted on the completed well on 6 April 2018; the results are included in Appendix I.

The surveyed location for well WB-04 is as follows:

Northing (feet)	Easting (feet)	Measuring Point Elevation (feet amsl)
746131.41	847659.81	1479.03

**Notes:**  
*Northing and easting locations provided in State Plane North American Datum 1983, vertical location provided in North American Vertical Datum 1988.*  
*amsl – feet above mean sea level*

### XIII. Downhole Equipment

The equipment installed in well WB-04 is Westbay multi-level sampling equipment installed by Westbay Instruments. Diagrams of the installed equipment are included in Appendix J.

The type and depth of equipment installed in each well is not constrained by the UIC Permit or the Aquifer Protection Permit (APP). This information is provided in accordance with Section 2.7.4.3 of the APP. Operational considerations may require that the type and depth of equipment be changed in response to conditions observed during operations.

### XIV. References

Brown and Caldwell, Inc., 2018. *PTF Mine Block Ambient Groundwater Concentrations and Initial Discharge Characterization of the Underground Workings*. Prepared for Florence Copper. August.

Daniel B. Stephens, Inc., 2014. *Geochemical Evaluation to Forecast Composition of Process Solutions for In-Situ Copper Recovery Pilot Test Facility at Florence Copper, Florence Arizona*. Prepared for Florence Copper. May.

Haley & Aldrich, Inc., 2017. *Bid Specification: Drilling, Installation, and Testing of Class III Westbay Wells, Production Test Facility, Florence, Arizona*. Revised September 2017.

Enclosures:

- Figure 1 – Well Locations
- Figure 2 – Well WB-04 As-Built Diagram
- Figure 3 – Geophysical Data and Lithologic Log
- Appendix A – Arizona Department of Water Resources Well Registry Report
- Appendix B – Lithologic Log
- Appendix C – Chemical Characteristics of Formation Water
- Appendix D – Well Completion Documentation
- Appendix E – Geophysical Logs

Florence Copper Inc.

14 September 2018

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Appendix F – Cement Bond Log Summary

Appendix G – SAPT Documentation

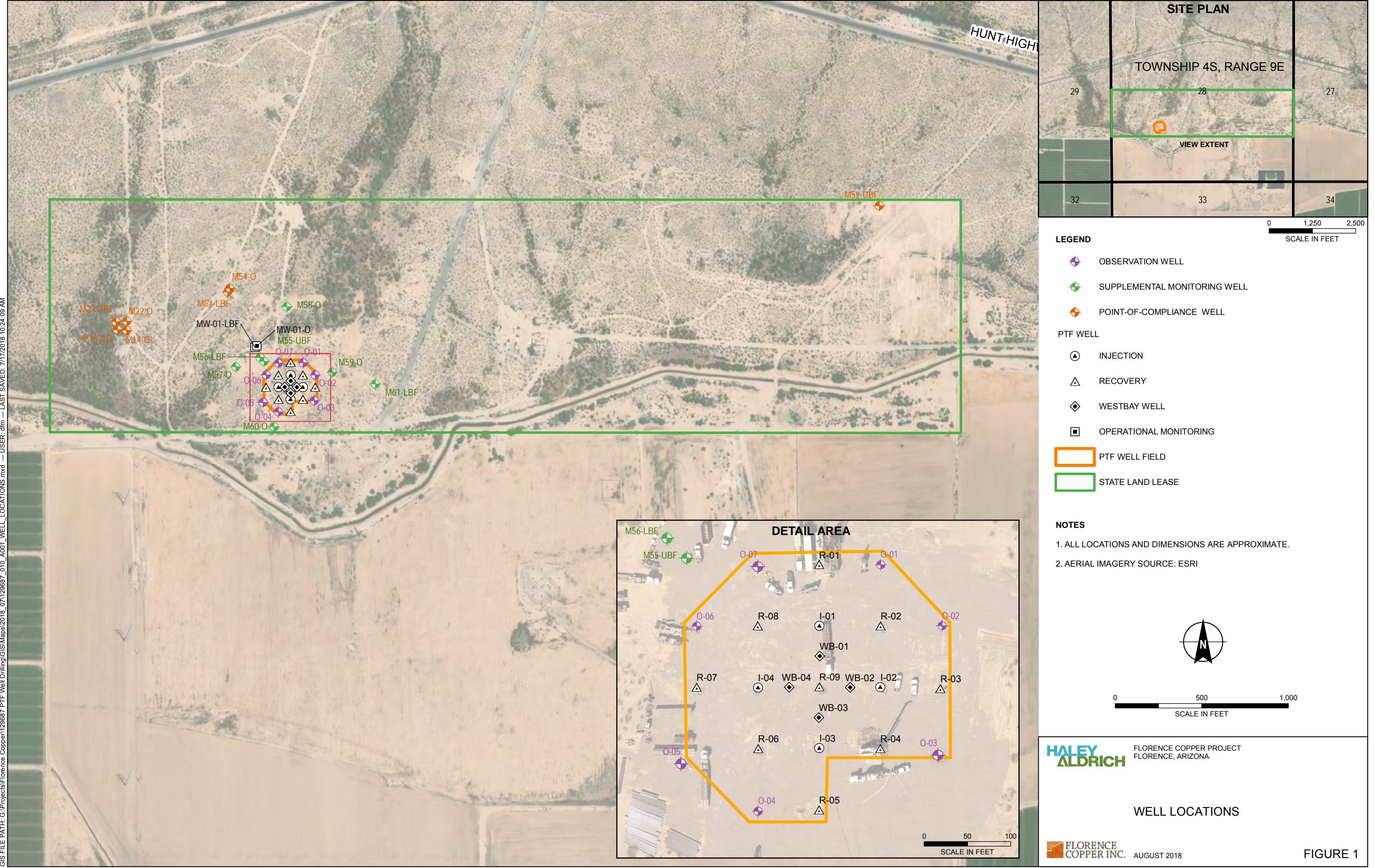
Appendix H – Well Development Field Forms

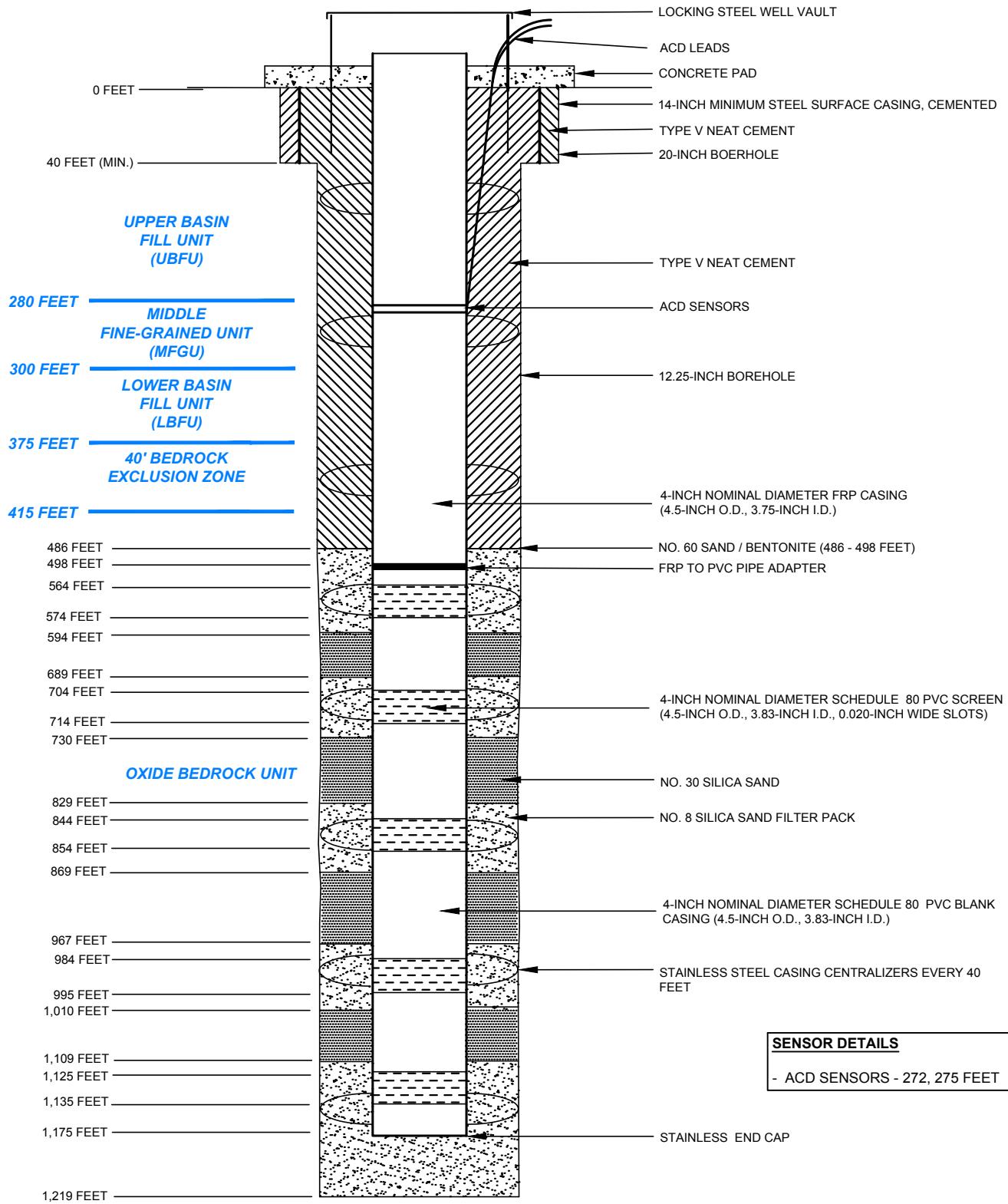
Appendix I – Well Video Log and Gyroscopic Survey Reports

Appendix J – Downhole Equipment

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vers\_F.docx

## **FIGURES**





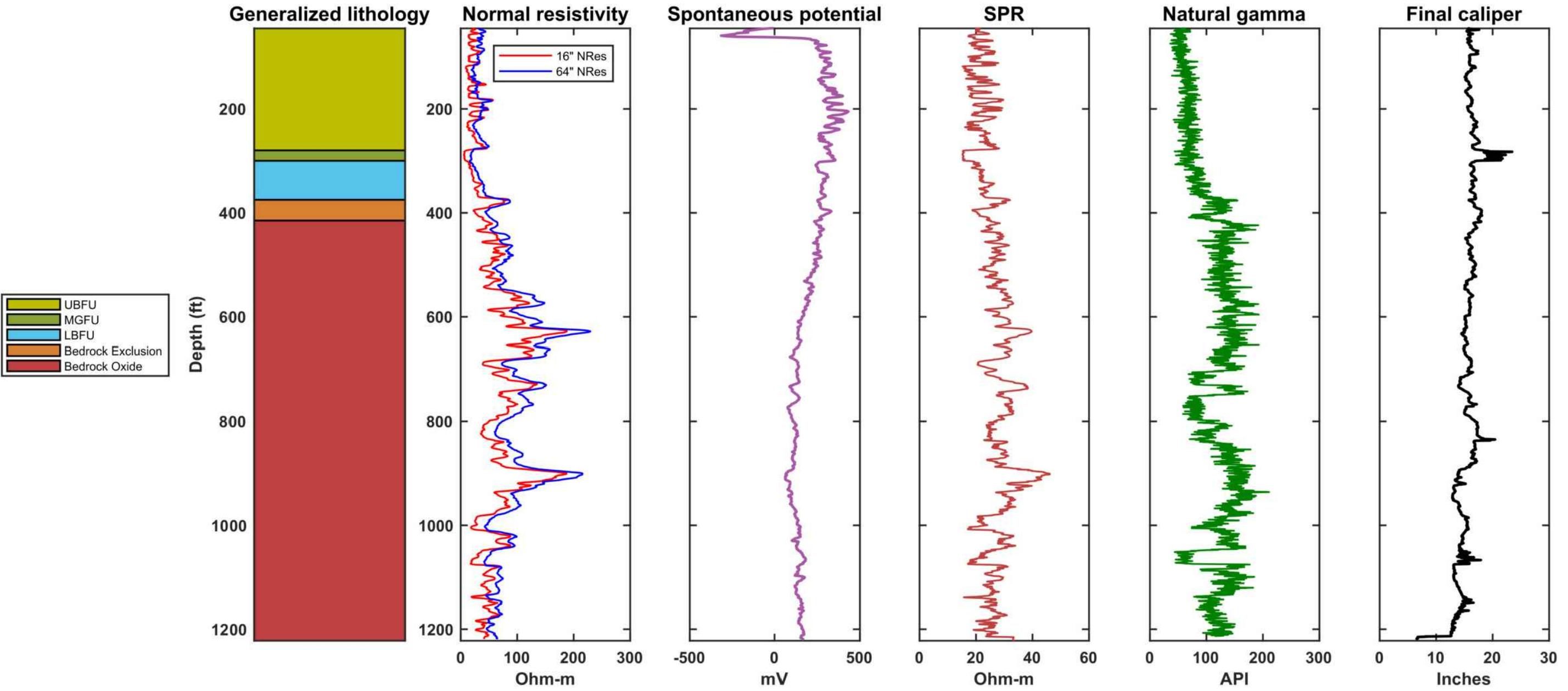
#### NOTES

1. WELL REGISTRATION NO.: 55-227229
2. CADASTRAL LOCATION: D(4-9) 28 CAC
3. MEASURING POINT ELEVATION: 1479.79 FEET AMSL
4. I.D. = INSIDE DIAMETER
5. O.D. = OUTSIDE DIAMETER
6. PVC = POLYVINYL CHLORIDE
7. FRP = FIBERGLASS REINFORCED PLASTIC
8. ACD = ANNULAR CONDUCTIVITY DEVICE
9. DOWNHOLE EQUIPMENT INSTALLED BY WESTBAY INSTRUMENTS



PRODUCTION TEST FACILITY  
FLORENCE COPPER, INC.  
FLORENCE, ARIZONA

WESTBAY WELL WB-04  
AS-BUILT DIAGRAM



## **APPENDIX A**

### **Arizona Department of Water Resources Well Registry Report**



**Arizona Department of Water Resources**  
 Water Management Division  
 P.O. Box 36020 Phoenix, Arizona 85067-6020  
 (602) 771-8627 • (602) 771-8690 fax  
[www.azwater.gov](http://www.azwater.gov)

**RECEIVED**

AUG 20 2018

**Well Driller Report  
and  
Well Log**

CT

THIS REPORT MUST BE FILED WITHIN 30 DAYS OF COMPLETING THE WELL.

PLEASE PRINT CLEARLY USING BLACK OR BLUE INK.

FILE NUMBER <b>D (4-9) 28 CAC</b>
WELL REGISTRATION NUMBER <b>55 - 227229</b>
PERMIT NUMBER (IF ISSUED)

**SECTION 1. DRILLING AUTHORIZATION**

**Drilling Firm**

<b>Mail To:</b>	NAME <b>Hydro Resources Inc.</b>	DWR LICENSE NUMBER <b>816</b>
	ADDRESS <b>13027 County Rd. 18 Unit C</b>	TELEPHONE NUMBER <b>(303) 857-7544</b>
	CITY / STATE / ZIP <b>Ft. Lupton, CO 80621</b>	FAX <b>(303) 857-2826</b>

**SECTION 2. REGISTRY INFORMATION**

**Well Owner**

FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL <b>Florence Copper Inc.</b>	<b>Location of Well</b>						
WELL LOCATION ADDRESS (IF ANY)							
MAILING ADDRESS <b>1575 W. Hunt Hwy</b>	TOWNSHIP (N/S) <b>4S</b>	RANGE (E/W) <b>9E</b>	SECTION <b>28</b>	160 ACRE <b>SW 1/4</b>	40 ACRE <b>NE 1/4</b>	10 ACRE <b>SW 1/4</b>	
CITY / STATE / ZIP CODE <b>Florence, AZ 85132</b>	LATITUDE <b>33 ° 3' 0.71 "N</b>	LONGITUDE <b>-111 ° 26' 5.09 "W</b>					
CONTACT PERSON NAME AND TITLE <b>Ian Ream - Sr. Hydrologist</b>	METHOD OF LATITUDE/LONGITUDE (CHECK ONE) <input checked="" type="checkbox"/> *GPS: Hand-Held <input type="checkbox"/> *GPS: Survey-Grade						
TELEPHONE NUMBER <b>(520) 374-3984</b>	LAND SURFACE ELEVATION AT WELL <b>1492</b> Feet Above Sea Level						
WELL NAME (e.g., MW-1, PZ-3, Lot 25 Well, Smith Well, etc.) <b>WB - 04</b>	METHOD OF ELEVATION (CHECK ONE) <input checked="" type="checkbox"/> *GPS: Hand-Held <input type="checkbox"/> *GPS: Survey-Grade						
		*GEOGRAPHIC COORDINATE DATUM (CHECK ONE) <input checked="" type="checkbox"/> NAD-83 <input type="checkbox"/> Other (please specify):					
		COUNTY <b>PINAL</b>	ASSESSOR'S PARCEL ID NUMBER BOOK   MAP   PARCEL				

**SECTION 3. WELL CONSTRUCTION DETAILS**

**Drill Method**

- CHECK ALL THAT APPLY
- Air Rotary
  - Bored or Augered
  - Cable Tool
  - Dual Rotary
  - Mud Rotary
  - Reverse Circulation
  - Driven
  - Jetted
  - Air Percussion / Odex Tubing
  - Other (please specify):

**Method of Well Development**

- CHECK ALL THAT APPLY
- Airlift
  - Bail
  - Surge Block
  - Surge Pump
  - Other (please specify):

**Method of Sealing at Reduction Points**

- CHECK ONE
- None
  - Packed
  - Swedged
  - Welded
  - Other (please specify):

**Condition of Well**

- CHECK ONE
- Capped
  - Pump Installed

**Construction Dates**

DATE WELL CONSTRUCTION STARTED

02/05/2018

DATE WELL CONSTRUCTION COMPLETED

05/23/2018

I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and belief.  
 SIGNATURE OF QUALIFYING PARTY

DATE

5/23/2018

**Well Driller Report and Well Log**

 WELL REGISTRATION NUMBER  
**55 - 227229**
**SECTION 4. WELL CONSTRUCTION DESIGN (AS BUILT) (attach additional page if needed)**
**Depth**

DEPTH OF BORING

**1219**

Feet Below Land Surface

DEPTH OF COMPLETED WELL

**1175**

Feet Below Land Surface

**Water Level Information**

STATIC WATER LEVEL

**227**

Feet Below Land Surface

 DATE MEASURED  
**04/06/2018**

 TIME MEASURED  
**1 PM**

 IF FLOWING WELL, METHOD OF FLOW REGULATION  
 Valve    Other:

Borehole		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	Installed Casing			IF OTHER TYPE, DESCRIBE	PERFORATION TYPE (T)	SLOT SIZE IF ANY (inches)
						STEEL	PVC	ABS			
0	40	30	0	40	24.5	X				X	
40	486	20	0	486	14.5	X				X	
486	1219	12.25	0	498	5.44				FRP	X	
			498	564	5.56	X				X	
			564	574	5.56	X					.020
			574	704	5.56	X				X	
			704	714	5.56	X					.020
			714	844	5.56	X				X	
			844	854	5.56	X				X	.020

**Installed Annular Material**

ANNULAR MATERIAL TYPE (T)

DEPTH FROM SURFACE		NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	CEMENT-BENTONITE GROUT	BENTONITE			IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE	FILTER PACK		
FROM (feet)	TO (feet)					GROUT	CHIPS	PELLETS		SAND	GRAVEL	SIZE
0	40		X									
0	486		X									
486	498				X							
498	594											
594	689					X				X		6-9
689	730											
730	829						X			X		6-9
829	869											
869	967							X		X		6-9

## **Well Driller Report and Well Log**

WELL REGISTRATION NUMBER  
**55 - 227229**

**SECTION 5. GEOLOGIC LOG OF WELL**

**Well Driller Report and Well Log**WELL REGISTRATION NUMBER  
**55 - 227229****SECTION 6. WELL SITE PLAN**

NAME OF WELL OWNER

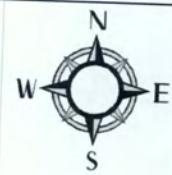
Florence Copper Inc.

COUNTY ASSESSOR'S PARCEL ID NUMBER  
BOOK

MAP

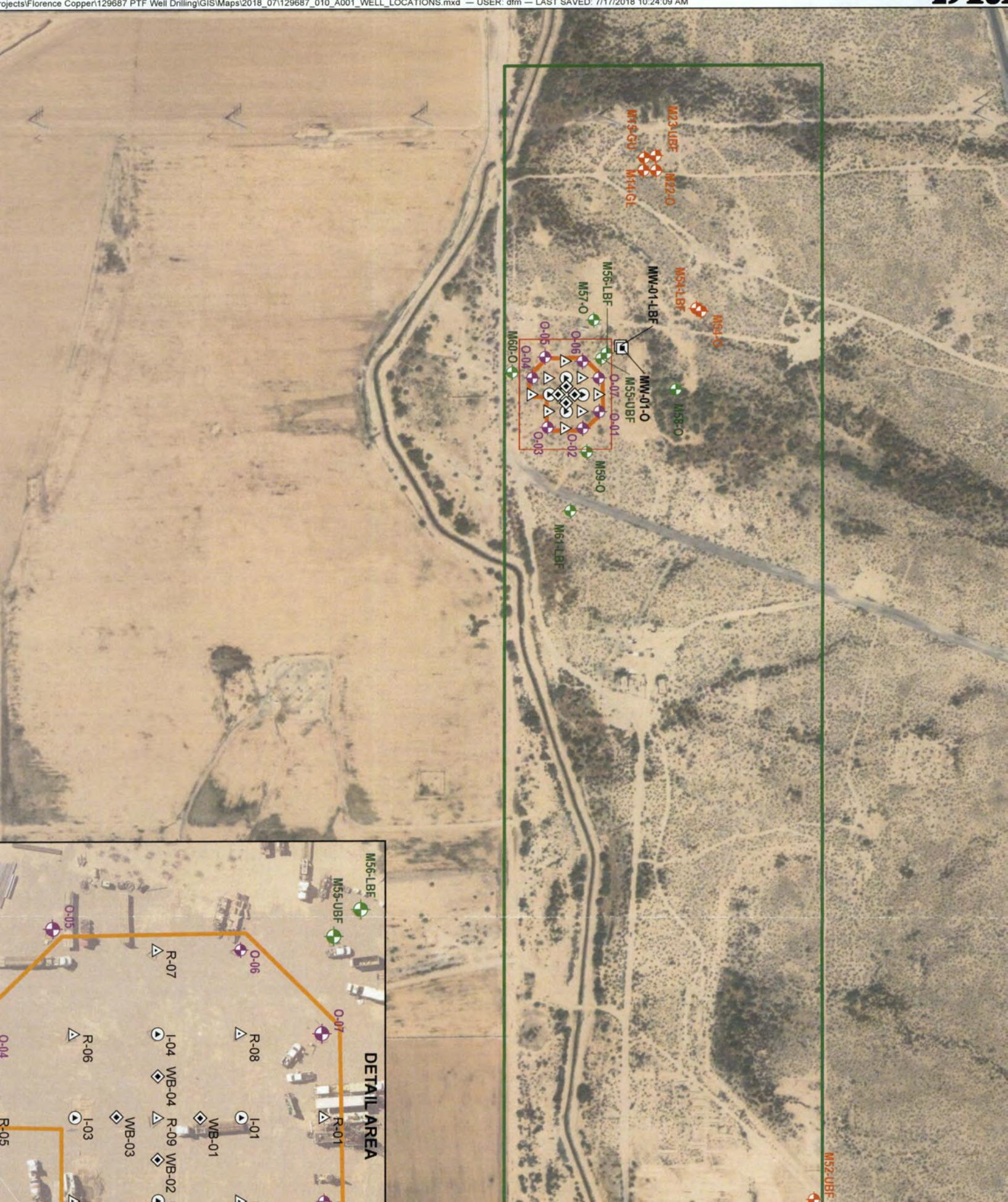
PARCEL

- ❖ Please draw the following: (1) the boundaries of property on which the well was located; (2) the well location; (3) the locations of all septic tank systems and sewer systems on the property or within 100 feet of the well location, even if on neighboring properties; and (4) any permanent structures on the property that may aid in locating the well.
- ❖ Please indicate the distance between the well location and any septic tank system or sewer system.



1" = \_\_\_\_ ft

**SEE ATTACHED MAP**



Run Date: 04/25/2017

## AZ DEPARTMENT OF WATER RESOURCES

### WELL REGISTRY REPORT - WELLS55

Location D 4.0 9.0 28 C A C Well Reg.No 55 - 227229 AMA PINAL AMA

Registered AZ STATE LAND DEPT.  
Name 1616 W. ADAMS ST.  
ATTN: LISA ATKINS  
PHOENIX File Type NEW WELLS (INTENTS OR APPLICATIONS)  
Application/Issue Date 04/19/2017

Owner OWNER Well Type ENV - MONITOR  
Driller No. 823 SubBasin ELOY  
Driller Name NATIONAL EWP, INC. Watershed UPPER GILA RIVER  
Driller Phone 480-558-3500 Registered Water Uses MONITORING  
County PINAL Registered Well Uses MONITOR  
Intended Capacity GPM 0.00 Discharge Method NO DISCHARGE METHOD LISTED  
Power NO POWER CODE LISTED

Well Depth	0.00	Case Diam	0.00	Tested Cap	0.00
Pump Cap.	0.00	Case Depth	0.00	CRT	
Draw Down	0.00	Water Level	0.00	Log	
		Acres Irrig	0.00	Finish	NO CASING CODE LISTED

Contamination Site: NO - NOT IN ANY REMEDIAL ACTION SITE

Tribe: Not in a tribal zone

Comments Well WB-04  
AZ State Land Dept. Mineral Lease #11-026500

#### Current Action

4/25/2017 555 DRILLER & OWNER PACKETS MAILED  
Action Comment: TNV

#### Action History

4/25/2017 550 DRILLING AUTHORITY ISSUED  
Action Comment: TNV  
4/19/2017 155 NOI RECEIVED FOR A NEW NON-PRODUCTION WELL  
Action Comment: TNV

**ARIZONA DEPARTMENT OF WATER RESOURCES**  
1110 W. Washington St. Suite 310  
Phoenix, Arizona 85007

THIS AUTHORIZATION SHALL BE IN POSSESSION OF THE DRILLER DURING ALL DRILLING OPERATIONS

WELL REGISTRATION NO: 55-227229 WELL OWNER ID: WB-04

AUTHORIZED DRILLER: NATIONAL EWP, INC.

LICENSE NO: 823

NOTICE OF INTENTION TO DRILL ENV - MONITOR WELL(S) HAS BEEN FILED WITH THE DEPARTMENT BY:

WELL OWNER: AZ STATE LAND DEPT. 1616 W. ADAMS ST. ATTN: LISA ATKINS PHOENIX, AZ, 85007

THE WELL(S) IS/ARE TO BE LOCATED IN THE:

SW 1/4 of the NE 1/4 of the SW 1/4 Section 28 Township 4.0 SOUTH Range 9.0 EAST

NO. OF WELLS IN THIS PROJECT: 1

THIS AUTHORIZATION EXPIRES AT MIDNIGHT ON THE DAY OF April 19, 2018

*Suzanne M. Miller*

**GROUNDWATER PERMITTING AND WELLS**

THE DRILLER MUST FILE A LOG OF THE WELL WITHIN 30 DAYS OF COMPLETION OF DRILLING.



ARIZONA DEPARTMENT OF WATER RESOURCES  
1110 W. Washington St. Suite 310  
Phoenix, AZ 85007  
602-771-8500  
azwater.gov

April 25, 2017

AZ STATE LAND DEPT.  
1616 W. ADAMS ST.  
ATTN: LISA ATKINS  
PHOENIX, AZ 85007



Registration No. 55- 227229  
File Number: D(4-9) 28 CAC

DOUGLAS A. DUCEY  
Governor

THOMAS BUSCHATZKE  
Director

Dear Well Applicant:

Enclosed is a copy of the Notice of Intention to Drill (NOI) a well which you or your driller recently filed with the Department of Water Resources. This letter is to inform you that the Department has approved the NOI and has mailed, or made available for download, a drilling authorization card to your designated well drilling contractor. The driller may not begin drilling until he/she has received the authorization, and must keep it in their possession at the well site during drilling. Although the issuance of this drill card authorizes you to drill the proposed well under state law, the drilling of the well may be subject to restrictions or regulations imposed by other entities.

Well drilling activities must be completed within one year after the date the NOI was filed with the Department. If drilling is not completed within one year, a new NOI must be filed and authorization from this Department received before proceeding with drilling. If the well cannot be successfully completed as initially intended (dry hole, cave in, lost tools, etc.), the well must be properly abandoned and a Well Abandonment Completion Report must be filed by your driller [as required by A.A.C. R12-15-816(F)].

If you change drillers, you must notify the Department of the new driller's identity on a Request to Change Well Information (form 55-71A). Please ensure that the new driller is licensed by the Department to drill the type of well you require. A new driller may not begin drilling until he/she receives a new drilling authorization card from the Department.

If you find it necessary to change the location of the proposed well(s), you may not proceed with drilling until you file an amended NOI with the Department. An amended drilling authorization card will then be issued to the well drilling contractor, which must be in their possession before drilling begins.

Arizona statute [A.R.S. § 45-600] requires registered well owners to file a Pump Installation Completion Report (form 55-56) with the Department within 30 days after the installation of pumping equipment, if authorized. A blank report is enclosed for your convenience. State statute also requires the driller to file a complete and accurate Well Drillers Report and Well Log (form 55-55) within 30 days after completion of drilling. A blank report form was provided to your driller with the drilling authorization card. You should insist and ensure that all of the required reports are accurately completed and timely filed with the Department.

Please be advised that Arizona statute [A.R.S. § 45-593(C)] requires a registered well owner to notify the Department of a change in ownership of the well and/or information pertaining to the physical characteristics of the well in order to keep this well registration file current and accurate. Any change in well information or a request to change well driller must be filed on a Request to Change Well Information form (form 55-71A) that may be downloaded from the ADWR Internet website at [www.azwater.gov](http://www.azwater.gov).

Sincerely,

Groundwater Permitting and Wells Section

A handwritten signature in black ink, appearing to read "Atkins" above "Lisa". The signature is fluid and cursive, with a large, stylized "A" at the beginning.



**Arizona Department of Water Resources**  
**Groundwater Permitting and Wells Section**  
**P.O. Box 36020 Phoenix, Arizona 85067-6020**  
**(602) 771-8500 • (602) 771-8690**  
**• [www.azwater.gov](http://www.azwater.gov)**

**Notice of Intent to  
Drill, Deepen, or Modify a  
Monitor / Piezometer / Environmental Well**

\$150  
FEE

- ❖ Review instructions prior to completing form in black or blue ink.
  - ❖ You must include with your Notice:
    - \$150 check or money order for the filing fee.
    - Well construction diagram, labeling all specifications listed in Section 6 and Section 7.
- Authority for fee: A.R.S. § 45-596 and A.A.C. R12-15-104.

AMA / INA <i>Pinzal</i>	B SB <i>PIN 11</i>	FILE NUMBER <i>D(4-9)28 CAC</i>
RECEIVED <i>4/19/2017</i>	DATE <i>08 UCR</i>	WELL REGISTRATION NUMBER <i>55 - 227229</i>
ISSUED <i>4/25/2017</i>	DATE <i>000</i>	REMEDIAL ACTION SITE

### SECTION 1. REGISTRY INFORMATION

To determine the location of well, please refer to the Well Registry Map (<https://aisweb.azwater.gov/WellRegistry/Default.aspx>) and/or Google Earth (<http://www.earthpoint.us/Townships.aspx>)

Well Type	Proposed Action	Location of Well
CHECK ONE  <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Piezometer <input type="checkbox"/> Vadose Zone <input type="checkbox"/> Air Sparging <input type="checkbox"/> Soil Vapor Extraction <input type="checkbox"/> Other (please specify): <i>APR 19 2017</i>	CHECK ONE  <input checked="" type="checkbox"/> Drill New Well <input type="checkbox"/> Deepen <input type="checkbox"/> Modify  WELL REGISTRATION NUMBER <i>(if Deepening or Modifying)</i> <i>55 -</i>	WELL LOCATION ADDRESS (IF ANY)  TOWNSHIP(N/S) RANGE (E/W) SECTION 160 ACRE 40 ACRE 10 ACRE <i>4.0 S 9.0 E 28 SW 1/4 NE 1/4 SW 1/4</i>  COUNTY ASSESSOR'S PARCEL ID NUMBER BOOK MAP PARCEL 1001  COUNTY WHERE WELL IS LOCATED PINAL

### SECTION 2. OWNER INFORMATION

Land Owner  FULL NAME OF COMPANY, ORGANIZATION, OR INDIVIDUAL AZ State Land Dept (Mineral Lease # 11-026500)	Well Owner (check this box if Land Owner and Well Owner are same <input type="checkbox"/> )  FULL NAME OF COMPANY, GOVERNMENT AGENCY, OR INDIVIDUAL Florence Copper, Inc.		
MAILING ADDRESS  1616 W Adams St	MAILING ADDRESS  1575 W Hunt Hwy		
CITY / STATE / ZIP CODE  Phoenix, AZ 85007	CITY / STATE / ZIP CODE  Florence, AZ 85132		
CONTACT PERSON NAME AND TITLE  Lisa Atkins, State Land Commissioner	CONTACT PERSON NAME AND TITLE  Ian Ream, Senior Hydrogeologist		
TELEPHONE NUMBER  (602) 542-4631	FAX  (520) 374-3984	TELEPHONE NUMBER  (520) 374-3999	FAX  (520) 374-3999

### SECTION 3. DRILLING AUTHORIZATION

Drilling Firm  NAME National EWP	Consultant (if applicable)  CONSULTING FIRM Haley & Aldrich, Inc.		
DWR LICENSE NUMBER  823	ROC LICENSE CATEGORY  A-4	CONTACT PERSON NAME  Mark Nicholls	
TELEPHONE NUMBER  (480) 558-3500	FAX  480-558-3525	TELEPHONE NUMBER  602-760-2423	FAX  602-760-2448
EMAIL ADDRESS  jstephens@nationalewp.com	EMAIL ADDRESS  mnicholls@haleyaldrich.com		

### SECTION 4.

Questions	Yes	No	Explanation:
1. Are all annular spaces between the casing(s) and the borehole for the placement of grout at least 2 inches?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2-inch annular spaces are special standards required for wells located in and near groundwater contamination sites (such as CERCLA, WQARF, DOD, LUST).
2. Is the screened or perforated interval of casing greater than 100 feet in length?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	100-foot maximum screen intervals are a special standard for wells located in and near groundwater contamination sites (such as CERCLA, WQARF, DOD, LUST).
3. Are you requesting a variance to use thermoplastic casing in lieu of steel casing in the surface seal?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The wells must be constructed in a vault. Pursuant to A.A.C. R12-15-801 (27) a "vault" is defined as a tamper-resistant watertight structure used to complete a well below the land surface.
4. Is there another well name or identification number associated with this well? (e.g., MW-1, PZ2, 06-04, etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, please state WB-04
5. Have construction plans been coordinated with the Arizona Department of Environmental Quality?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If yes, please state agency contact & phone number David Haag, 602-771-4669
6. For monitor wells, is dedicated pump equipment to be installed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	If yes, please state design pump capacity (Gallons per Minute)
7. Is this well a new well located in an Active Management Area AND intended to pump water for the purpose of remediating groundwater?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	You must also file a supplemental form A.R.S. § 45-454(c) & (f) unless the well is a replacement well and the total number of operable wells on the site is not increasing. (See instructions)
8. Will the well registration number be stamped on the vault cover or on the upper part of the casing?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	If no, where will the registration number be placed?

## Notice of Intent to Drill, Deepen, or Modify a Monitor / Piezometer / Environmental Well

WELL REGISTRATION NUMBER  
55 - 227229

## SECTION 6. WELL CONSTRUCTION DETAILS

Drill Method	Method of Well Development	Grout Emplacement Method
CHECK ONE  <input type="checkbox"/> Air Rotary <input type="checkbox"/> Bored or Augered <input type="checkbox"/> Cable Tool <input type="checkbox"/> Dual Rotary <input checked="" type="checkbox"/> Mud Rotary <input type="checkbox"/> Reverse Circulation <input type="checkbox"/> Driven <input type="checkbox"/> Jetted <input type="checkbox"/> Air Percussion / Odex Tubing <input type="checkbox"/> Other (please specify):  DATE CONSTRUCTION TO BEGIN 05/01/2017	CHECK ONE  <input checked="" type="checkbox"/> Airlift <input type="checkbox"/> Bail <input type="checkbox"/> Surge Block <input type="checkbox"/> Surge Pump <input type="checkbox"/> Other (please specify):  <b>Method of Sealing at Reduction Points</b>	CHECK ONE  <input checked="" type="checkbox"/> Tremie Pumped (Recommended) <input type="checkbox"/> Gravity <input type="checkbox"/> Pressure Grout <input type="checkbox"/> Other (please specify):  <b>Surface or Conductor Casing</b>
	CHECK ONE  <input checked="" type="checkbox"/> None <input type="checkbox"/> Welded <input type="checkbox"/> Swedged <input type="checkbox"/> Packed <input type="checkbox"/> Other (please specify):  	CHECK ONE  <input type="checkbox"/> Flush Mount in a vault <input checked="" type="checkbox"/> Extends at least 1' above grade

## SECTION 7. PROPOSED WELL CONSTRUCTION PLAN (attach additional page if needed)

Attach a well construction diagram labeling all specifications below.

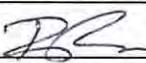
Borehole			Casing													
DEPTH FROM SURFACE		BOREHOLE DIAMETER (inches)	DEPTH FROM SURFACE		OUTER DIAMETER (inches)	MATERIAL TYPE (T)			PERFORATION TYPE (T)			SLOT SIZE IF ANY (inches)				
FROM (feet)	TO (feet)		FROM (feet)	TO (feet)		STEEL	PVC	ABS	IF OTHER TYPE, DESCRIBE	BLANK OR NONE	WIRE WRAP		SHUTTER SCREEN	MILLS KNIFE	SLOTTED	IF OTHER TYPE, DESCRIBE
0	20	18	0	20	14	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
20	1210	9.875	0	500	4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
PERFORATED: 565-575, 705-715			845-855, 985-995, 1125-1135			FIBERGLASS REINFORCED						0.020				
BLANK: 500-565, 575-705, 715-845			855-985, 995-1125, 1135-1200			<input type="checkbox"/>			<input type="checkbox"/>			<input checked="" type="checkbox"/>				
Annular Material																
DEPTH FROM SURFACE		ANNULAR MATERIAL TYPE (T)										FILTER PACK				
FROM (feet)	TO (feet)	NONE	CONCRETE	NEAT CEMENT OR CEMENT GROUT	BENTONITE GROUT	BENTONITE	GROUT	CHIPS	PELLETS	IF OTHER TYPE OF ANNULAR MATERIAL, DESCRIBE				SAND	GRAVEL	SIZE
0	490	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input type="checkbox"/>	<input type="checkbox"/>	
490	495	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					<input checked="" type="checkbox"/>	<input type="checkbox"/>	No. 30-70
MULTIPLE INTERVALS, SEE DESCRIPTION		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	FILTER PACK: 495-585, 695-725, 835-865, 975-1005, 1115-1210 NEAT CEMENT: 585-695, 725-835, 865-975, 1005-1115				<input type="checkbox"/>	<input type="checkbox"/>	No. 10-20
IF THIS WELL HAS NESTED CASINGS, SPECIFY NUMBER OF CASING STRINGS										EXPECTED DEPTH TO WATER (Feet Below Ground Surface)				220		

## SECTION 8. PERMISSION TO ACCESS

By checking this box, I hereby provide ADWR permission to enter the property for the purpose of taking water level measurements at this well. (See instructions.)

## SECTION 9. LAND OWNER AND WELL OWNER SIGNATURE

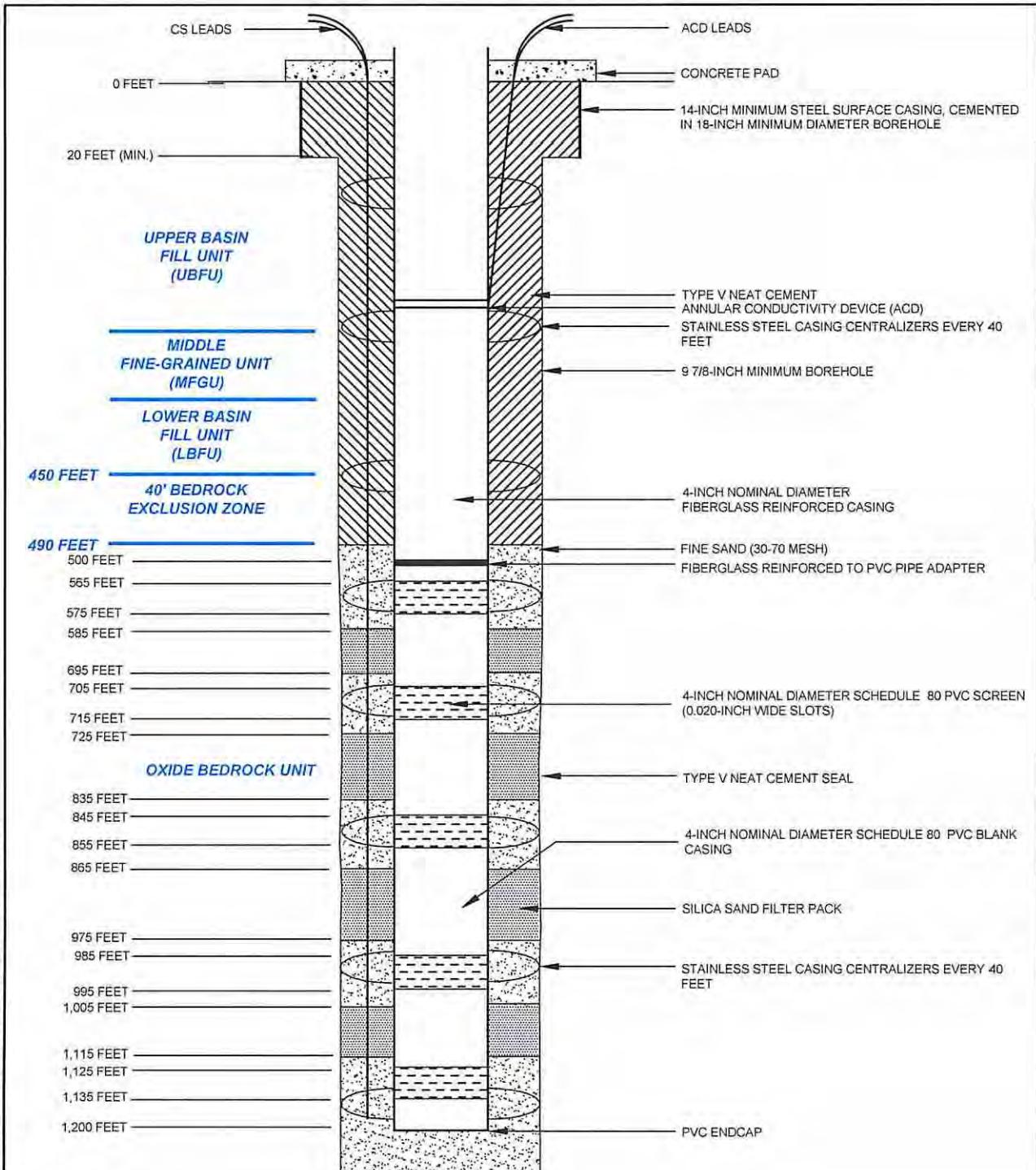
I state that this notice is filed in compliance with A.R.S. § 45-596 and is complete and correct to the best of my knowledge and

Land Owner	Well Owner (if different from Land Owner; See instructions)
PRINT NAME AND TITLE	PRINT NAME AND TITLE Ian Ream, Senior Hydrogeologist
SIGNATURE OF LAND OWNER	SIGNATURE OF WELL OWNER 
DATE	DATE 4-17-2017
<input type="checkbox"/> By checking this box, you agree to allow ADWR to contact you via electronic mail.	<input type="checkbox"/> By checking this box, you agree to allow ADWR to contact you via electronic mail.
EMAIL ADDRESS	EMAIL ADDRESS IanReam@florencecopper.com

**SECTION 5. Well Construction Diagram**

Provide a well construction diagram showing all existing well construction features listed in Section 6 and Section 7.

See attached well diagram.



**HALEY ALDRICH**

FLORENCE COPPER, INC.  
FLORENCE, ARIZONA

WESTBAY WELL  
CONSTRUCTION DIAGRAM

**FLORENCE COPPER INC.**

SCALE: NOT TO SCALE

FIGURE 1

20

21

200310240

20031018E

21101010A

20031054B

20035007

200310450

20035002B

20031054A

**PINAL AMA**

29

28

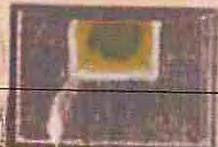
T 4S  
R 9E

ARIZONA

20035003

200310200

20035006A



200370010

20038001A

33

32

20038001B

20

21

200310240

20031018E

21101010A

20031054B

200310450

20035007

20031054A

20035002B

## PINAL AMA

29

28

T 4S  
R 9E

20035003

ARIZONA

20035006A

200310200

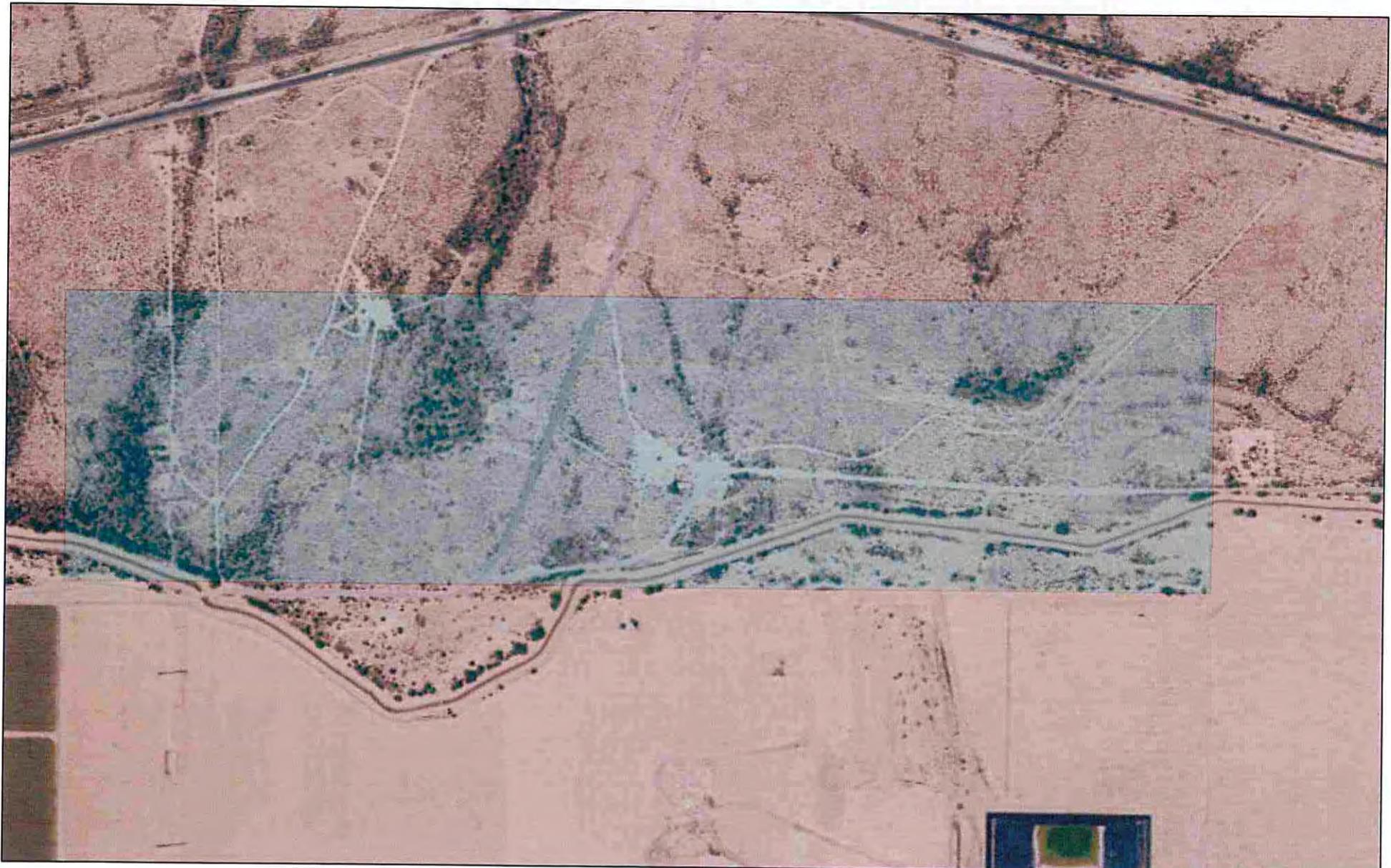
200370010

20038001A 33

32

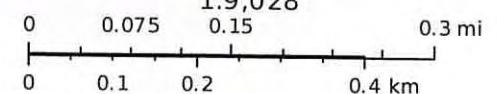
20038001B

# Arizona State Land Department



April 25, 17

1:9,028



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User

## Torren Valdez

---

**From:** Robert Harding <RHarding@azland.gov>  
**Sent:** Tuesday, April 25, 2017 9:49 AM  
**To:** Torren Valdez  
**Subject:** ASLD (Landowner) Approval for NOI's - Lease #11-26500

FYI

**From:** Robert Harding  
**Sent:** Wednesday, March 15, 2017 2:31 PM  
**To:** samurillo@azwater.gov  
**Cc:** Fred Breedlove <FBreedlove@azland.gov>; Joe Dixon <jdixon@azland.gov>; Heide Kocsis <HKocsis@azland.gov>  
**Subject:** ASLD (Landowner) Approval for NOI's - Lease #11-26500

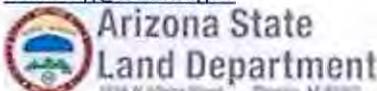
Stella,

As you are aware, Florence Copper is in the process of registering a number of existing wells on State Trust Lease #11-26500 which were originally installed using single registration numbers to permit multiple monitor well installations. A number of these wells will then be permanently abandoned in accordance with Arizona Department of Water Resources (ADWR) requirements. The lessee, Florence Copper, has discussed the specifics of this registration/abandonment process with the Arizona State Land Department (ASLD), and the Department has no objection to the proposed activities.

Please accept this email as documentation of Landowner's approval for the Notice of Intent (NOI) application filings for well registration and abandonment, currently being submitted to ADWR by Florence Copper on ASLD Lease #11-26500, Section 28, T4S, R9E.

Thank you.  
Best regards,

Bob Harding  
Hydrologist  
Water Rights Section  
Arizona State Land Department  
602.542.2672  
[rharding@azland.gov](mailto:rharding@azland.gov)



## Torren Valdez

---

**From:** Ian Ream <[IanReam@florencecopper.com](mailto:IanReam@florencecopper.com)>  
**Sent:** Friday, January 13, 2017 9:06 AM  
**To:** Torren Valdez  
**Subject:** Re: Map of monitor well locations

Hi Torren,

The pumps will be QED micro purge. They typically do a liter or two a minute. Very low flow. Looking for discreet interval samples. The flow rate is based on drawdown. The goal is not to draw down the well much more than a half a foot or 1 foot.

Thanks,

Ian Ream  
Senior Hydrogeologist  
Florence Copper

On Jan 13, 2017, at 8:56 AM, Torren Valdez <[tvaldez@azwater.gov](mailto:tvaldez@azwater.gov)> wrote:

Ian,

Would you happen to know the pump capacity (gpm) for the low-flow pumps that will be installed on those monitoring wells?

Thank you,

Torren Valdez  
Water Planning & Permitting Division  
Arizona Department of Water Resources  
602.771.8614

<image002.jpg>

---

**From:** Ian Ream [<mailto:IanReam@florencecopper.com>]  
**Sent:** Thursday, January 12, 2017 11:13 AM  
**To:** Torren Valdez <[tvaldez@azwater.gov](mailto:tvaldez@azwater.gov)>  
**Subject:** Map of monitor well locations

Hi Torren,

Here is a map with the well locations.

Please don't hesitate to contact me if you need anything else or have any questions.

Cheers,

Ian

**Ian Ream** Senior Hydrogeologist

<image003.jpg>

Florence Copper Inc.

1575 W. Hunt Highway Florence AZ USA 85132

C 520-840-9604 T 520-374-3984 F 520-374-3999

E [ianream@florencecopper.com](mailto:ianream@florencecopper.com) Web [florencecopper.com](http://florencecopper.com)

---

\*Notice Regarding Transmission

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## **NOTICE**

A.R.S. § 41-1030(B), (D), (E) and (F) provide as follows:

- B. An agency shall not base a licensing decision in whole or in part on a licensing requirement or condition that is not specifically authorized by statute, rule or state tribal gaming compact. A general grant of authority in statute does not constitute a basis for imposing a licensing requirement or condition unless a rule is made pursuant to that general grant of authority that specifically authorizes the requirement or condition.
- D. This section may be enforced in a private civil action and relief may be awarded against the state. The court may award reasonable attorney fees, damages and all fees associated with the license application to a party that prevails in an action against the state for a violation of this section.
- E. A state employee may not intentionally or knowingly violate this section. A violation of this section is cause for disciplinary action or dismissal pursuant to the agency's adopted personnel policy.
- F. This section does not abrogate the immunity provided by section 12-820.01 or 12-820.02.

ARIZONA DEPARTMENT OF WATER RESOURCES  
1110 W. Washington St. Suite 310  
Engineering and Permits Division  
Phoenix, AZ 85007  
602-771-8500

**NOTICE TO WELL DRILLERS**

This is a reminder that a valid drill card be present for the drilling of each and every well constructed on a site.\* The problem seems to occur during the construction of a well when an unexpected problem occurs. Either the hole collapses, the hole is dry, a drill bit is lost and can't be recovered, or any number of other situations where the driller feels that he needs to move over and start another well. If you encounter this type of scenario, please be aware drillers do not have the authority to start another well without first obtaining drilling authority for the new well. Please note the following statutes and regulations pertaining to well drilling and construction:

**ARIZONA REVISED STATUTE (A.R.S.)**

**A.R.S. § 45-592.A.**

**A person may construct, replace or deepen a well in this state only pursuant to this article and section 45-834.01. The drilling of a well may not begin until all requirements of this article and section 45-834.01, as applicable, are met.**

\*\*\*

**A.R.S. § 594.A.**

**The director shall adopt rules establishing construction standards for new wells and replacement wells, the deepening and abandonment of existing wells and the capping of open wells.**

\*\*\*

**A.R.S. § 600.A**

**A well driller shall maintain a complete and accurate log of each well drilled.**

**ARIZONA ADMINISTRATIVE CODE (A.A.C.)**

**A.A.C. R12-15-803.A.**

**A person shall not drill or abandon a well, or cause a well to be drilled or abandoned, in a manner which is not in compliance with A.R.S. Title 45, Chapter 2, Article 10, and the rules adopted thereunder.**

\*\*\*

**A.A.C. R12-15-810.A.**

**A well drilling contractor or single well licensee may commence drilling a well only if the well drilling contractor or licensee has possession of a drilling card at the well site issued by the Director in the name of the well drilling contractor or licensee, authorizing the drilling of the specific well in the specific location.**

\*\*\*

**A.A.C. R12-15-816.F.**

**In the course of drilling a new well, the well may be abandoned without first filing a notice of intent to abandon and without an abandonment card.**

**\* THIS REQUIREMENT DOES NOT PERTAIN TO THE DRILLING OF MINERAL EXPLORATION,  
GEOTECHNICAL OR HEAT PUMP BOREHOLES**

## Transaction Receipt - Success

Arizona Water Resources  
Arizona Water Resources  
MID:347501639533  
1700 W Washington St  
Phoenix , AZ 85012  
602-771-8454

---

04/19/2017 11:49AM  
Remittance ID  
Arizona041917144729704Chr  
Transaction ID:  
183294013

---

KELSEY SHERRARD  
500 Main Street  
WOODLAND, California 95695  
United States  
Visa - 3420  
Approval Code: 050257

---

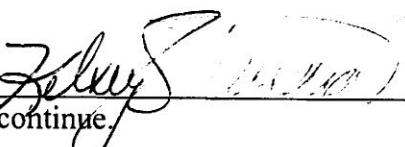
Sale  
Amount: \$1,650.00

---

multiple  
N/A  
Cash receipts  
0  
dgchristiana@azwater.gov

---

Cardmember acknowledges  
receipt of goods and/or  
services in the amount of  
the total shown hereon and  
agrees to perform the  
obligations set forth by the  
cardmember's agreement with  
the issuer.

Signature   
[click here to continue](#)

**Arizona Department of Water Resources**

1110 West Washington Street, Suite 310

Phoenix AZ 85007

Customer:

KELSEY SHERRARD  
NATIONAL EWP  
500 MAIN STREET  
WOODLAND, CA 95695

Receipt #: 17-50968  
Office: MAIN OFFICE  
Receipt Date: 04/19/2017  
Sale Type: Mail  
Cashier: WRDGC

Item No.	Function Code	AOBJ	Description	Ref ID	Qty	Unit Price	Ext Price
8505	122221	4439-6F	MONITOR, PIEZOMETER, AIR SPARGING, SOIL VAPOR EXTR	multiple wells	11	150.00	1,650.00
<b>RECEIPT TOTAL:</b>						<b>1,650.00</b>	

Payment type: CREDIT CARD

Amount Paid: \$1,650.00

Payment Received Date: 04/19/2017

Authorization 183294013

Notes:

**APPENDIX B**  
**Lithologic Log**

LITHOLOGIC LOG							WB-04
Project Production Test Facility, Florence, Arizona Client Florence Copper, Inc. Contractor Cascade Drilling LLC							File No. 129687 Sheet No. 1 of 15 Cadastral Location D (4-9) 28 CAC
Drilling Method Reverse Rotary Borehole Diameter(s) 20/12.25 in. Rig Make & Model Challenger 280			Land Surface Elevation 1478.17 feet, amsl Datum State Plane NAD 83 Location N 746,131 E 847,660				Start 5 February 2018 Finish 25 February 2018 H&A Rep. K. Ford
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION			COMMENTS
0		SW-SM		<b>WELL GRADED SAND with SILT (0-55 feet)</b> Primarily fine to medium sand with ~10% fines and ~5% gravel up to 6mm. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are brown (7.5YR 5/4). UBFU			<p><b>Well Registry ID:</b> 55-227229  <b>Surface Completion:</b> Concrete Pad  <b>Well casing stickup:</b> 2.00 feet als  <b>COLOR IDENTIFICATION MADE WITH WET SAMPLES USING MUNSELL CHART</b></p> <p><b>Surface Casing:</b> 14-inch mild steel; 0 - 20 feet  <b>Well Casing:</b> Nominal 4-inch diameter Fiberglass Reinforced; 0 - 500 feet</p> <p><b>Unit Intervals:</b>  UBFU: 0 - 280 feet  MGFU: 280 - 300 feet  LBFU: 300 - 375 feet  Oxide Bedrock: 375 - 1220 feet</p>
-1475							
-1470							
-1465							
-1460							
-1455							
-1450							
-1445							
-1440							
-1435							
-1430							
-1425							
-1420	GW		55	<b>WELL GRADED GRAVEL with SAND (55-60 feet)</b> Primarily gravel up to 25mm with ~20% sand and ~5% fines. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are very dark gray (7.5YR 3/1). UBFU			
-1415	SP		60	<b>POORLY GRADED SAND (60-65 feet)</b> Primarily medium sand with ~5% fines and ~5% gravel up to 10mm. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are dark gray (7.5YR 4/1). UBFU			
-1410	SW		65	<b>WELL GRADED SAND (65-95 feet)</b> Primarily medium to fine sand with ~5% fines and ~10% gravel up to 35mm. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are brown (7.5YR 4/2). UBFU			
-1405							
-1400							
-1395							
-1390							
-1385							
-1380							
-1375							
-1370							
-1365							
-1360							
-1355							
-1350							
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-1005							
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-25							
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-15							
-10							
-5							
0							

HALEY ALDRICH

## LITHOLOGIC LOG

WB-04

Project Production Test Facility, Florence, Arizona  
Client Florence Copper, Inc.  
Contractor Cascade Drilling LLC

File No. 129687  
Sheet No. 1 of 15  
Cadastral Location D (4-9) 28 CAC

Drilling Method Reverse Rotary  
Borehole Diameter(s) 20/12.25 in.  
Rig Make & Model Challenger 280

Land Surface Elevation 1478.17 feet, amsl  
Datum State Plane NAD 83  
Location N 746,131 E 847,660

Start 5 February 2018  
Finish 25 February 2018  
H&A Rep. K. Ford

31 Aug 18

H&A-LITHOLOG-PHOENIX-NOWELL HA-LIB09-PHXGLB LITHOLOGIC REPORT DATATEMPLATE+ GDT \\HALEYALDRICH\SHAREBOS\COMMON\129687\GINTV129687-LITH WB-04

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

WB-04

LITHOLOGIC LOG							WB-04 File No. 129687 Sheet No. 2 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION			
-75							
-1400							
80							
1395							
85							
1390							
90							
1385							
95	SC		95	<b>CLAYEY SAND (95-100 feet)</b> Primarily fine sand with ~40% fines and ~10% gravel up to 25mm. Sand and gravel is subangular to subrounded. Fines have low plasticity, low toughness, low dry strength, and are brown (7.5YR 5/4). <b>UBFU</b>			
1380			100	<b>WELL GRADED SAND with GRAVEL (100-120 feet)</b> Primarily coarse sand with ~5% fines and ~20% gravel up to 45mm. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are brown (7.5YR 5/3). <b>UBFU</b>			<b>Seal:</b> Type V neat cement 0 - 490 feet Fine sand/bentonite 486 - 498 feet
100	SW						
1375							
105							
1370							
110							
1365							
115							
1360							
120	SC		120	<b>CLAYEY SAND (120-135 feet)</b> Primarily fine to medium sand with ~40% fines and ~5% gravel up to 30mm. Sand and gravel is subangular to subrounded. Fines have medium plasticity, low toughness, low dry strength, and are brown (7.5YR 5/4). <b>UBFU</b>			
1355							
125							
1350							
130							
1345							
135	SW-SC		135	<b>WELL GRADED SAND with CLAY and GRAVEL (135-160 feet)</b> Primarily coarse to fine sand with ~10% fines and ~20% gravel up to 20mm. Sand and gravel is subangular to subrounded. Fines have low plasticity, low toughness, low dry strength, and are brown (7.5YR 4/3). <b>UBFU</b>			
1340							
140							
1335							
145							
1330							
150							
1325							
155							
1320							
160	GW		160	<b>WELL GRADED GRAVEL (160-170 feet)</b> Primarily gravel up to 50mm with ~10%			
160							

LITHOLOGIC LOG					WB-04 File No. 129687 Sheet No. 3 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION	
-1315				sand and ~5% fines. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are gray (7.5YR 5/1). <b>UBFU</b>	
-165					
-1310					
-170		CL	170	<b>SANDY LEAN CLAY (170-175 feet)</b> Primarily fines with ~35% sands and ~5% gravel up to 15mm. Sand and gravel is subangular to subrounded. Fines have medium plasticity, medium toughness, medium dry strength, and are brown (7.5YR 3/4). <b>UBFU</b>	
-1305					
-175		GW	175	<b>WELL GRADED GRAVEL with SAND (175-200 feet)</b> Primarily gravel up to 45 mm with ~15% sands and ~5% fines. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, and are dark gray (7.5YR 4/1). <b>UBFU</b>	
-1300					
-180					
-1295					
-185					
-1290					
-190					
-1285					
-195					
-1280					
-200		SM	200	<b>CLAYEY SAND (200-210 feet)</b> Primarily medium to fine sand with ~30% fines and ~5% gravel up to 15mm. Sand and gravel is subangular to subrounded. Fines have low plasticity, low toughness, low dry strength, and are brown (7.5YR 5/4). <b>UBFU</b>	
-1275					
-205					
-1270		CH	210	<b>FAT CLAY (210-215 feet)</b> Primarily fines with ~10% sands and trace gravel up to 5mm. Sand and gravel is subangular to subrounded. Fines have high plasticity, high toughness, high dry strength, are light brown (7.5YR 6/4), and a weak reaction to HCL. <b>UBFU</b>	
-1265					
-215		GW	215	<b>WELL GRADED GRAVEL with SAND (215-225 feet)</b> Primarily gravel up to 40mm with ~15% sands and trace fines. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, are brown (7.5YR 5/3), and no reaction to HCL. <b>UBFU</b>	
-1260					
-220					
-1255					
-225		CL	225	<b>LEAN CLAY with SAND (225-240 feet)</b> Primarily fines with ~20% sands and ~5% gravel up to 6mm. Sand and gravel is subangular to subrounded. Fines have medium plasticity, medium toughness, medium dry strength, are light brown (7.5YR 6/4), and a weak reaction to HCL. <b>UBFU</b>	
-1250					
-230					
-1245					
-235					
-1240					
-240		GW	240	<b>WELL GRADED GRAVEL with SAND (240-275 feet)</b> Primarily gravel up to 42mm with ~30% sands and ~15% fines. Sand and gravel is subangular to subrounded. Fines are nonplastic, no toughness, no dry strength, are brown (7.5YR 5/3), and no reaction to HCL. <b>UBFU</b>	
-1235					
-245					
-1230					

LITHOLOGIC LOG							WB-04 File No. 129687 Sheet No. 4 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION			
-250							
-1225							
-255							
-1220							
-260							
-1215							
-265							
-1210							
-270							
-1205							
-275	SW		275				
-1200							
-280	CH		280				
-1195							
-285							
-1190							
-290							
-1185							
-295							
-1180							
-300	CL		300				
-1175							
-305							
-1170							
-310			310				
-1165							
-315							
-1160							
-320							
-1155							
-325							
-1150							
-330							
-1145							
-335							
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).							WB-04

**HALEY  
ALDRICH**

## LITHOLOGIC LOG

WB-04

File No. 129687  
Sheet No. 5 of 15

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
1140				
-340				
1135				
-345				
1130				
-350				
1125				
-355				
1120				
-360				
1115				
-365				
1110				
-370				
1105				
-375	375			<b>QUARTZ MONZONITE (375-410 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.
1100				
-380				
1095				
-385				
1090				
-390				
1085				
-395				
1080				
-400				
1075				
-405				
1070				
-410	410			<b>QUARTZ MONZONITE (410-700 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%. Abundant Cu minerals at 420-435 and 530-535 feet.
1065				
-415				
1060				
-420				
1055	422			

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

WB-04

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 6 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>		
-1055				<b>QUARTZ MONZONITE (410-700 feet) Continued</b>		
-425						
-1050						
-430						
-1045						
-435						
-1040						
-440						
-1035						
-445						
-1030						
-450						
-1025						
-455						
-1020						
-460						
-1015						
-465						
-1010						
-470						
-1005						
-475						
-1000						
-480						
-995						
-485						
-990						
-490						
-985						
-495						
-980						
-500						
-975						
-505						
-970						

<b>HALEY ALDRICH</b> <h1 style="text-align: center;">LITHOLOGIC LOG</h1>					<b>WB-04</b> File No. 129687 Sheet No. 7 of 15
Depth (ft) Elevation USCS Symbol Stratum Change Depth (ft)	<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>				
-510 -965 -515 -960 -520 -955 -525 -950 -530 -945 -535 -940 -540 -935 -545 -930 -550 -925 -555 -920 -560 -915 -565 -910 -570 -905 -575 -900 -580 -895 -585 -890 -590 -885 -595	<b>509 QUARTZ MONZONITE (410-700 feet) Continued</b>				
					<b>Well Screen:</b> Nominal 4-inch diameter, SCH 80 PVC Screen (0.020-inch slots); 564 - 574, 704 - 714, 844 - 854, 984 - 995, 1125 - 1135 feet
31 Aug 18 \\\HALEYALDRICH\COMMON\SHAREBOS_COMMON\129687\GINT\129687-LITH KF GPU HA-LIB09-PHX.GLB LITHOLOGIC REPORT DATATEMPLATE+ GDT					
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					<b>WB-04</b>

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 8 of 15
<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>						
<b>596 QUARTZ MONZONITE (410-700 feet) Continued</b>						
880 875 870 865 860 855 850 845 840 835 830 825 820 815 810 805 800 795 790 785 780 775 770 765 760 755 750 745 740 735 730 725 720 715 710 705 700 695 690 685 680						
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)			
31 Aug 18 <b>\H\&amp;A\LITHOLOG\PHOENIX\NO WELL HA-LIB09-PHX.GLB LITHOLOGIC REPORT DATATEMPLATE+ GDT \H\&amp;A\SHAREBOS_COMMON\129687\GINTV129687-LITH KF GPU</b>						
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).						<b>WB-04</b>

**HALEY  
ALDRICH**

## LITHOLOGIC LOG

WB-04

File No. 129687  
Sheet No. 9 of 15

Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION
-795				
-685				
-790				
-690				
-785				
-695				
-780				
-700	700			<b>DIABASE (700-730 feet)</b> Dark gray to black igneous rock.
-775				
-705				
-770				
-710				
-765				
-715				
-760				
-720				
-755				
-725				
-750				
-730	730			<b>QUARTZ MONZONITE (730-830 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.
-745				
-735				
-740				
-730				
-745				
-725				
-750				
-735				
-745				
-720				
-755				
-730				
-760				
-715				
-765				
-710				

NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).

WB-04

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 10 of 15
<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>						
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)			
-770				<b>QUARTZ MONZONITE (730-830 feet) Continued</b>		
-705						
-775						
-700						
-780						
-695						
-785						
-690						
-790						
-685						
-795						
-680						
-800						
-675						
-810						
-665						
-815						
-660						
-820						
-655						
-825						
-650						
-830	830			<b>GRANODIORITE (830-845 feet)</b> Contains mostly plagioclase in a gray aphanitic matrix with biotite crystals composing approximately 10%.		
-645						
-835						
-640						
-840						
-635						
-845	845			<b>QUARTZ MONZONITE (845-1000 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.		
-630						
-850						
-625						
-855						
			856			

<b>HALEY ALDRICH</b> <b>LITHOLOGIC LOG</b>					<b>WB-04</b> File No. 129687 Sheet No. 11 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)		
<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>					
QUARTZ MONZONITE (845-1000 feet) Continued					
-620					
-860					
-615					
-865					
-610					
-870					
-605					
-875					
-600					
-880					
-595					
-885					
-590					
-890					
-585					
-895					
-580					
-900					
-575					
-905					
-570					
-910					
-565					
-915					
-560					
-920					
-555					
-925					
-550					
-930					
-545					
-935					
-540					
-940					
535	943				

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 12 of 15
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION		
<b>QUARTZ MONZONITE (845-1000 feet) Continued</b>						
-945						
-530						
-950						
-525						
-955						
-520						
-960						
-515						
-965						
-510						
-970						
-505						
-975						
-500						
-980						
-495						
-985						
-490						
-990						
-485						
-995						
-480						
-1000			1000	<b>DIABASE (1000-1010 feet)</b> Dark gray to black igneous rock.		
-475						
-1005						
-470						
-1010			1010	<b>QUARTZ MONZONITE (1010-1220 feet)</b> Consists of quartz at approximately 35%, potassium feldspars at approximately 35%, plagioclase at approximately 25%, and biotite at approximately 5%.		
-465						
-1015						
-460						
-1020						
-455						
-1025						
-450						
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).						<b>WB-04</b>

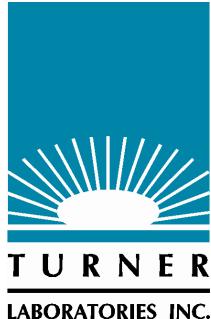
<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 13 of 15	
Depth (ft)	Elevation	USCS Symbol	<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>				
1030	1030		QUARTZ MONZONITE (1010-1220 feet) Continued				
-445							
1035							
-440							
1040							
-435							
1045							
-430							
1050							
-425							
1055							
-420							
1060							
-415							
1065							
-410							
1070							
-405							
1075							
-400							
1080							
-395							
1085							
-390							
1090							
-385							
1095							
-380							
1100							
-375							
1105							
-370							
1110							
-365							
1115							
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).					<b>WB-04</b>		

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 14 of 15
<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>						
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)			
-360					1117	QUARTZ MONZONITE (1010-1220 feet) Continued
-360						
-355						
-350						
-345						
-340						
-335						
-330						
-325						
-320						
-315						
-310						
-305						
-300						
-295						
-290						
-285						
-280						
-275					1203	

<b>HALEY ALDRICH</b>					<b>LITHOLOGIC LOG</b>	<b>WB-04</b> File No. 129687 Sheet No. 15 of 15			
Depth (ft)	Elevation	USCS Symbol	Stratum Change Depth (ft)	<b>VISUAL-MANUAL IDENTIFICATION AND DESCRIPTION</b>					
1205				QUARTZ MONZONITE (1010-1220 feet) Continued					
270									
1210									
265									
1215									
260									
1220			1220						
<b>Total Borehole Depth:</b> Driller = 1220 feet; Geophysical Logging = 1220 feet									
H&A-LITHOLOG-PHOENIX-NO WELL HA-LIB09-PHX.GLB LITHOLOGIC REPORT DATATEMPLATE+ GDT \\HALEYALDRICH.COM\SHAREBOS_COMMON\129687\GINTV129687-LITH KF GPU 31 Aug 18									
NOTE: Lithologic descriptions, group symbols, and grain-size determinations based on the USCS visual-manual method (Haley & Aldrich OP2001A - Field Practice for Soil Identification and Description).									
					<b>WB-04</b>				

**APPENDIX C**

**Chemical Characteristics of Formation Water**



May 23, 2018

Barbara Sylvester  
Brown & Caldwell  
201 E. Washington Suite 500  
Phoenix, AZ 85004

TEL (602) 567-3894  
FAX -

RE: PTF

Work Order No.: 18D0619  
Order Name: Florence Copper

Dear Barbara Sylvester,

Turner Laboratories, Inc. received 2 sample(s) on 04/25/2018 for the analyses presented in the following report.

All results are intended to be considered in their entirety, and Turner Laboratories, Inc. is not responsible for use of less than the complete report. Results apply only to the samples analyzed. Samples will be disposed of 30 days after issue of our report unless special arrangements are made.

The pages that follow may contain sensitive, privileged or confidential information intended solely for the addressee named above. If you receive this message and are not the agent or employee of the addressee, this communication has been sent in error. Please do not disseminate or copy any of the attached and notify the sender immediately by telephone. Please also return the attached sheet(s) to the sender by mail.

Please call if you have any questions.

Respectfully submitted,

Turner Laboratories, Inc.  
ADHS License AZ0066

A handwritten signature in black ink, appearing to read "Kevin Brim".

Kevin Brim  
Project Manager

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**Order: Florence Copper**

### **Work Order Sample Summary**

<b>Lab Sample ID</b>	<b>Client Sample ID</b>	<b>Matrix</b>	<b>Collection Date/Time</b>
18D0619-01	R-09	Ground Water	04/23/2018 1555
18D0619-02	TB	Ground Water	04/25/2018 0000

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**Case Narrative**

The 8015D analysis was performed by TestAmerica Laboratories, Inc. in Phoenix, AZ.

The radiochemistry analysis was performed by Radiation Safety Engineering, Inc. in Chandler, AZ.

D5 Minimum Reporting Limit (MRL) is adjusted due to sample dilution; analyte was non-detect in the sample.

H5 This test is specified to be performed in the field within 15 minutes of sampling; sample was received and analyzed past the regulatory holding time.

M3 The spike recovery value is unusable since the analyte concentration in the sample is disproportionate to the spike level. The associated LCS/LCSD recovery was acceptable.

All soil, sludge, and solid matrix determinations are reported on a wet weight basis unless otherwise noted.

ND Not Detected at or above the PQL

PQL Practical Quantitation Limit

DF Dilution Factor

PRL Project Reporting Limit

**Turner Laboratories, Inc.****Date: 05/23/2018**

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Lab Sample ID:** 18D0619-01

**Client Sample ID:** R-09  
**Collection Date/Time:** 04/23/2018 1555  
**Matrix:** Ground Water  
**Order Name:** Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
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**ICP Dissolved Metals-E 200.7 (4.4)**

Calcium	140	4.0	M3	mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Iron	ND	0.30		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Magnesium	27	3.0		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Potassium	6.8	5.0		mg/L	1	04/27/2018	1440	05/04/2018	1150	MH
Sodium	170	5.0	M3	mg/L	1	04/27/2018	1440	05/04/2018	1150	MH

**ICP/MS Dissolved Metals-E 200.8 (5.4)**

Aluminum	ND	0.0800	D5	mg/L	2	04/27/2018	1440	05/07/2018	1139	MH
Antimony	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Arsenic	0.0016	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Barium	0.071	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Beryllium	ND	0.00050	D5	mg/L	2	04/27/2018	1440	05/07/2018	1139	MH
Cadmium	ND	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Chromium	0.0051	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Cobalt	ND	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Copper	0.011	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Lead	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Manganese	0.0020	0.00025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Nickel	0.0033	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Selenium	ND	0.0025		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Thallium	ND	0.00050		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH
Zinc	ND	0.040		mg/L	1	04/27/2018	1440	05/07/2018	1133	MH

**CVAA Dissolved Mercury-E 245.1**

Mercury	ND	0.0010		mg/L	1	04/26/2018	0955	04/26/2018	1639	MH
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**pH-E150.1**

pH (pH Units)	7.8	H5	-	1	04/26/2018	1615	04/26/2018	1616	AP
Temperature (°C)	22	H5	-	1	04/26/2018	1615	04/26/2018	1616	AP

**ICP/MS Total Metals-E200.8 (5.4)**

Uranium	0.016	0.00050		mg/L	1	04/27/2018	1230	04/30/2018	1348	MH
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**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Lab Sample ID:** 18D0619-01

**Client Sample ID:** R-09  
**Collection Date/Time:** 04/23/2018 1555  
**Matrix:** Ground Water  
**Order Name:** Florence Copper

Analyses	Result	PRL	PQL	Qual	Units	DF	Prep Date	Analysis Date	Analyst
<b>Anions by Ion Chromatography-E300.0 (2.1)</b>									
Chloride	310		25		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
Fluoride	ND		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrate (As N)	8.8		0.50		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Nitrogen, Nitrite (As N)	ND		0.10		mg/L	1	04/25/2018 1208	04/25/2018 1544	AP
Sulfate	190		130		mg/L	25	04/26/2018 1225	04/26/2018 1415	AP
<b>Cyanide-E335.4</b>									
Cyanide	ND		0.10		mg/L	1	04/26/2018 0845	04/30/2018 1545	AP
<b>Alkalinity-SM2320B</b>									
Alkalinity, Bicarbonate (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Carbonate (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Hydroxide (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Phenolphthalein (As CaCO3)	ND		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
Alkalinity, Total (As CaCO3)	150		2.0		mg/L	1	05/03/2018 1030	05/03/2018 1210	EJ
<b>Specific Conductance-SM2510 B</b>									
Conductivity	1700		0.20		μmhos/cm	2	05/09/2018 1315	05/09/2018 1330	AP
<b>Total Dissolved Solids (Residue, Filterable)-SM2540 C</b>									
Total Dissolved Solids (Residue, Filterable)	1000		20		mg/L	1	04/26/2018 0826	05/01/2018 1600	EJ
<b>Volatile Organic Compounds by GC/MS-SW8260B</b>									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 1943	KP
<i>Surr: 4-Bromofluorobenzene</i>	95	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	
<i>Surr: Dibromofluoromethane</i>	101	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	
<i>Surr: Toluene-d8</i>	77	70-130		%REC	1	05/07/2018 1824	05/07/2018 1943	KP	

**Turner Laboratories, Inc.****Date: 05/23/2018**

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Lab Sample ID:** 18D0619-02

**Client Sample ID:** TB  
**Collection Date/Time:** 04/25/2018 0000  
**Matrix:** Ground Water  
**Order Name:** Florence Copper

<b>Analyses</b>	<b>Result</b>	<b>PRL</b>	<b>PQL</b>	<b>Qual</b>	<b>Units</b>	<b>DF</b>	<b>Prep Date</b>	<b>Analysis Date</b>	<b>Analyst</b>
<b>Volatile Organic Compounds by GC/MS-SW8260B</b>									
Benzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Carbon disulfide	ND		2.0		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Ethylbenzene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Toluene	ND		0.50		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
Xylenes, Total	ND		1.5		ug/L	1	05/07/2018 1824	05/07/2018 2344	KP
<i>Surr: 4-Bromofluorobenzene</i>	101	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	
<i>Surr: Dibromofluoromethane</i>	110	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	
<i>Surr: Toluene-d8</i>	103	70-130		%REC	1	05/07/2018 1824	05/07/2018 2344	KP	

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD RPD	RPD Limit Qual	
<b>Batch 1804269 - E 245.1</b>									
<b>Blank (1804269-BLK1)</b> Prepared & Analyzed: 04/26/2018									
Mercury	ND	0.0010	mg/L						
<b>LCS (1804269-BS1)</b> Prepared & Analyzed: 04/26/2018									
Mercury	0.0049	0.0010	mg/L	0.005000	98	85-115			
<b>LCS Dup (1804269-BSD1)</b> Prepared & Analyzed: 04/26/2018									
Mercury	0.0048	0.0010	mg/L	0.005000	95	85-115	2	20	
<b>Matrix Spike (1804269-MS1)</b> Source: 18D0394-01 Prepared & Analyzed: 04/26/2018									
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	97	85-115		
<b>Matrix Spike Dup (1804269-MSD1)</b> Source: 18D0394-01 Prepared & Analyzed: 04/26/2018									
Mercury	0.0050	0.0010	mg/L	0.005000	0.00020	96	85-115	1	20
<b>Batch 1804292 - E200.8 (5.4)</b>									
<b>Blank (1804292-BLK1)</b> Prepared & Analyzed: 04/30/2018									
Uranium	ND	0.00050	mg/L						
<b>LCS (1804292-BS1)</b> Prepared & Analyzed: 04/30/2018									
Uranium	0.046	0.00050	mg/L	0.05000	92	85-115			
<b>LCS Dup (1804292-BSD1)</b> Prepared & Analyzed: 04/30/2018									
Uranium	0.046	0.00050	mg/L	0.05000	92	85-115	0.2	20	
<b>Matrix Spike (1804292-MS1)</b> Source: 18D0614-01 Prepared & Analyzed: 04/30/2018									
Uranium	0.051	0.00050	mg/L	0.05000	0.0015	99	70-130		
<b>Batch 1805051 - E 200.7 (4.4)</b>									
<b>Blank (1805051-BLK1)</b> Prepared & Analyzed: 05/04/2018									
Calcium	ND	4.0	mg/L						
Iron	ND	0.30	mg/L						
Magnesium	ND	3.0	mg/L						
Potassium	ND	5.0	mg/L						
Sodium	ND	5.0	mg/L						
<b>LCS (1805051-BS1)</b> Prepared & Analyzed: 05/04/2018									
Calcium	11	4.0	mg/L	10.00	109	85-115			
Iron	1.0	0.30	mg/L	1.000	104	85-115			
Magnesium	10	3.0	mg/L	10.00	105	85-115			
Potassium	10	5.0	mg/L	10.00	105	85-115			
Sodium	10	5.0	mg/L	10.00	105	85-115			
<b>LCS Dup (1805051-BSD1)</b> Prepared & Analyzed: 05/04/2018									
Calcium	11	4.0	mg/L	10.00	110	85-115	1	20	
Iron	1.0	0.30	mg/L	1.000	105	85-115	0.5	20	
Magnesium	10	3.0	mg/L	10.00	105	85-115	0.06	20	
Potassium	10	5.0	mg/L	10.00	105	85-115	0.05	20	
Sodium	11	5.0	mg/L	10.00	109	85-115	4	20	

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyst	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
<b>Batch 1805051 - E 200.7 (4.4)</b>										
<b>Matrix Spike (1805051-MS1)</b>										
Source: 18D0619-01 Prepared & Analyzed: 05/04/2018										
Calcium	150	4.0	mg/L	10.00	140	59	70-130		M3	
Iron	1.1	0.30	mg/L	1.000	0.028	105	70-130			
Magnesium	38	3.0	mg/L	10.00	27	108	70-130			
Potassium	17	5.0	mg/L	10.00	6.8	105	70-130			
Sodium	170	5.0	mg/L	10.00	170	30	70-130		M3	
<b>Matrix Spike (1805051-MS2)</b>										
Source: 18E0021-01 Prepared & Analyzed: 05/04/2018										
Calcium	64	4.0	mg/L	10.00	54	103	70-130			
Iron	1.0	0.30	mg/L	1.000	0.0060	101	70-130			
Magnesium	21	3.0	mg/L	10.00	11	99	70-130			
Potassium	15	5.0	mg/L	10.00	4.7	104	70-130			
Sodium	99	5.0	mg/L	10.00	90	87	70-130			
<b>Batch 1805069 - E 200.8 (5.4)</b>										
<b>Blank (1805069-BLK1)</b>										
Prepared & Analyzed: 05/07/2018										
Aluminum	ND	0.0400	mg/L							
Antimony	ND	0.00050	mg/L							
Arsenic	ND	0.00050	mg/L							
Barium	ND	0.00050	mg/L							
Beryllium	ND	0.00025	mg/L							
Cadmium	ND	0.00025	mg/L							
Chromium	ND	0.00050	mg/L							
Cobalt	ND	0.00025	mg/L							
Copper	ND	0.00050	mg/L							
Lead	ND	0.00050	mg/L							
Manganese	ND	0.00025	mg/L							
Nickel	ND	0.00050	mg/L							
Selenium	ND	0.0025	mg/L							
Thallium	ND	0.00050	mg/L							
Zinc	ND	0.040	mg/L							
<b>LCS (1805069-BS1)</b>										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.104	0.0400	mg/L	0.1000	104	85-115				
Antimony	0.048	0.00050	mg/L	0.05000	96	85-115				
Arsenic	0.050	0.00050	mg/L	0.05000	100	85-115				
Barium	0.050	0.00050	mg/L	0.05000	100	85-115				
Beryllium	0.049	0.00025	mg/L	0.05000	97	85-115				
Cadmium	0.050	0.00025	mg/L	0.05000	100	85-115				
Chromium	0.051	0.00050	mg/L	0.05000	102	85-115				
Cobalt	0.051	0.00025	mg/L	0.05000	101	85-115				
Copper	0.051	0.00050	mg/L	0.05000	103	85-115				
Lead	0.049	0.00050	mg/L	0.05000	98	85-115				
Manganese	0.050	0.00025	mg/L	0.05000	101	85-115				
Nickel	0.051	0.00050	mg/L	0.05000	102	85-115				
Selenium	0.051	0.0025	mg/L	0.05000	103	85-115				
Thallium	0.050	0.00050	mg/L	0.05000	101	85-115				
Zinc	0.10	0.040	mg/L	0.1000	101	85-115				

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
<b>Batch 1805069 - E 200.8 (5.4)</b>										
<b>LCS Dup (1805069-BSD1)</b>										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.115	0.0400	mg/L	0.1000	115	85-115	10	20		
Antimony	0.048	0.00050	mg/L	0.05000	96	85-115	0.7	20		
Arsenic	0.050	0.00050	mg/L	0.05000	101	85-115	0.8	20		
Barium	0.051	0.00050	mg/L	0.05000	102	85-115	1	20		
Beryllium	0.049	0.00025	mg/L	0.05000	97	85-115	0.2	20		
Cadmium	0.050	0.00025	mg/L	0.05000	100	85-115	0.2	20		
Chromium	0.051	0.00050	mg/L	0.05000	102	85-115	0.4	20		
Cobalt	0.050	0.00025	mg/L	0.05000	101	85-115	0.5	20		
Copper	0.052	0.00050	mg/L	0.05000	105	85-115	2	20		
Lead	0.049	0.00050	mg/L	0.05000	98	85-115	0.1	20		
Manganese	0.050	0.00025	mg/L	0.05000	101	85-115	0.09	20		
Nickel	0.051	0.00050	mg/L	0.05000	103	85-115	0.8	20		
Selenium	0.052	0.0025	mg/L	0.05000	104	85-115	2	20		
Thallium	0.050	0.00050	mg/L	0.05000	101	85-115	0.06	20		
Zinc	0.10	0.040	mg/L	0.1000	104	85-115	3	20		
<b>Matrix Spike (1805069-MS1)</b>										
Source: 18D0693-01										
Prepared & Analyzed: 05/07/2018										
Aluminum	0.239	0.0400	mg/L	0.1000	0.166	74	70-130			
Antimony	0.045	0.00050	mg/L	0.05000	0.00024	90	70-130			
Arsenic	0.056	0.00050	mg/L	0.05000	0.0035	104	70-130			
Barium	0.16	0.00050	mg/L	0.05000	0.12	94	70-130			
Beryllium	0.045	0.00025	mg/L	0.05000	0.000029	90	70-130			
Cadmium	0.047	0.00025	mg/L	0.05000	ND	94	70-130			
Chromium	0.049	0.00050	mg/L	0.05000	0.00052	98	70-130			
Cobalt	0.048	0.00025	mg/L	0.05000	0.00097	95	70-130			
Copper	0.051	0.00050	mg/L	0.05000	0.0020	98	70-130			
Lead	0.047	0.00050	mg/L	0.05000	0.00016	94	70-130			
Manganese	0.054	0.00025	mg/L	0.05000	0.0075	94	70-130			
Nickel	0.049	0.00050	mg/L	0.05000	0.0018	94	70-130			
Selenium	0.057	0.0025	mg/L	0.05000	ND	114	70-130			
Thallium	0.048	0.00050	mg/L	0.05000	0.000038	96	70-130			
Zinc	0.11	0.040	mg/L	0.1000	ND	109	70-130			

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD RPD	RPD Limit	RPD Qual
<b>Batch 1804261 - SM2540 C</b>										
<b>Duplicate (1804261-DUP1)</b> <b>Source: 18D0606-01</b> Prepared: 04/26/2018 Analyzed: 04/27/2018										
Total Dissolved Solids (Residue, Filterable)										
630      20      mg/L      630      0.3      5										
<b>Duplicate (1804261-DUP2)</b> <b>Source: 18D0606-02</b> Prepared: 04/26/2018 Analyzed: 04/27/2018										
Total Dissolved Solids (Residue, Filterable)										
610      20      mg/L      620      0.8      5										
<b>Batch 1804268 - E335.4</b>										
<b>Blank (1804268-BLK1)</b> Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
ND      0.10      mg/L										
<b>LCS (1804268-BS1)</b> Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0      0.10      mg/L      2.000      101      90-110										
<b>LCS Dup (1804268-BSD1)</b> Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0      0.10      mg/L      2.000      101      90-110      0.1      20										
<b>Matrix Spike (1804268-MS1)</b> <b>Source: 18D0602-03</b> Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.1      0.10      mg/L      2.000      ND      103      90-110										
<b>Matrix Spike Dup (1804268-MSD1)</b> <b>Source: 18D0602-03</b> Prepared: 04/26/2018 Analyzed: 04/30/2018										
Cyanide										
2.0      0.10      mg/L      2.000      ND      98      90-110      5      20										
<b>Batch 1804272 - E150.1</b>										
<b>Duplicate (1804272-DUP1)</b> <b>Source: 18D0662-02</b> Prepared & Analyzed: 04/26/2018										
pH (pH Units)										
7.8      -      7.8      0.1      200      H5										
Temperature (°C)										
21      -      21      2      200      H5										
<b>Batch 1805027 - SM2320B</b>										
<b>LCS (1805027-BS1)</b> Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO <sub>3</sub> )										
240      2.0      mg/L      250.0      96      90-110										
<b>LCS Dup (1805027-BSD1)</b> Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO <sub>3</sub> )										
240      2.0      mg/L      250.0      96      90-110      0      10										
<b>Matrix Spike (1805027-MS1)</b> <b>Source: 18D0606-02</b> Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO <sub>3</sub> )										
370      2.0      mg/L      250.0      130      96      85-115										
<b>Matrix Spike Dup (1805027-MSD1)</b> <b>Source: 18D0606-02</b> Prepared & Analyzed: 05/03/2018										
Alkalinity, Total (As CaCO <sub>3</sub> )										
370      2.0      mg/L      250.0      130      95      85-115      0.5      10										
<b>Batch 1805103 - SM2510 B</b>										
<b>LCS (1805103-BS1)</b> Prepared & Analyzed: 05/09/2018										
Conductivity										
140      0.10      μmhos/cm      141.2      101      0-200										
<b>LCS Dup (1805103-BSD1)</b> Prepared & Analyzed: 05/09/2018										
Conductivity										
140      0.10      μmhos/cm      141.2      101      0-200      0.7      200										
<b>Duplicate (1805103-DUP1)</b> <b>Source: 18E0192-01</b> Prepared & Analyzed: 05/09/2018										
Conductivity										
4.0      0.10      μmhos/cm      4.0      0      10										

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD RPD	RPD Limit Qual
<b>Batch 1805074 - SW8260B</b>								
<b>Blank (1805074-BLK1)</b>								
Prepared & Analyzed: 05/07/2018								
Benzene	ND	0.50	ug/L					
Carbon disulfide	ND	2.0	ug/L					
Ethylbenzene	ND	0.50	ug/L					
Toluene	ND	0.50	ug/L					
Xylenes, Total	ND	1.5	ug/L					
<i>Surrogate: 4-Bromofluorobenzene</i>	25.0		ug/L	25.00	100	70-130		
<i>Surrogate: Dibromofluoromethane</i>	26.9		ug/L	25.00	107	70-130		
<i>Surrogate: Toluene-d8</i>	25.1		ug/L	25.00	100	70-130		
<b>LCS (1805074-BS1)</b>								
Prepared & Analyzed: 05/07/2018								
1,1-Dichloroethene	29		ug/L	25.00	114	70-130		
Benzene	27		ug/L	25.00	109	70-130		
Chlorobenzene	29		ug/L	25.00	115	70-130		
Toluene	25		ug/L	25.00	101	70-130		
Trichloroethene	26		ug/L	25.00	103	70-130		
<i>Surrogate: 4-Bromofluorobenzene</i>	24.6		ug/L	25.00	98	70-130		
<i>Surrogate: Dibromofluoromethane</i>	25.6		ug/L	25.00	102	70-130		
<i>Surrogate: Toluene-d8</i>	24.8		ug/L	25.00	99	70-130		
<b>LCS Dup (1805074-BSD1)</b>								
Prepared & Analyzed: 05/07/2018								
1,1-Dichloroethene	27		ug/L	25.00	110	70-130	4	30
Benzene	26		ug/L	25.00	104	70-130	5	30
Chlorobenzene	26		ug/L	25.00	105	70-130	9	30
Toluene	24		ug/L	25.00	96	70-130	5	30
Trichloroethene	25		ug/L	25.00	98	70-130	4	30
<i>Surrogate: 4-Bromofluorobenzene</i>	24.4		ug/L	25.00	98	70-130		
<i>Surrogate: Dibromofluoromethane</i>	26.1		ug/L	25.00	104	70-130		
<i>Surrogate: Toluene-d8</i>	25.1		ug/L	25.00	100	70-130		
<b>Matrix Spike (1805074-MS1)</b>								
Source: 18D0582-02 Prepared & Analyzed: 05/07/2018								
1,1-Dichloroethene	27		ug/L	25.00	0.070	109	70-130	
Benzene	26		ug/L	25.00	0.020	104	70-130	
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130	
Toluene	27		ug/L	25.00	3.5	95	70-130	
Trichloroethene	24		ug/L	25.00	0.040	97	70-130	
<i>Surrogate: 4-Bromofluorobenzene</i>	24.4		ug/L	25.00	98	70-130		
<i>Surrogate: Dibromofluoromethane</i>	26.4		ug/L	25.00	106	70-130		
<i>Surrogate: Toluene-d8</i>	24.9		ug/L	25.00	100	70-130		
<b>Matrix Spike Dup (1805074-MSD1)</b>								
Source: 18D0582-02 Prepared & Analyzed: 05/07/2018								
1,1-Dichloroethene	27		ug/L	25.00	0.070	108	70-130	0.8
Benzene	25		ug/L	25.00	0.020	101	70-130	2
Chlorobenzene	26		ug/L	25.00	0.0	105	70-130	0.3
Toluene	27		ug/L	25.00	3.5	95	70-130	0.1
Trichloroethene	24		ug/L	25.00	0.040	95	70-130	2
<i>Surrogate: 4-Bromofluorobenzene</i>	24.7		ug/L	25.00	99	70-130		
<i>Surrogate: Dibromofluoromethane</i>	26.4		ug/L	25.00	106	70-130		
<i>Surrogate: Toluene-d8</i>	25.3		ug/L	25.00	101	70-130		

**Client:** Brown & Caldwell  
**Project:** PTF  
**Work Order:** 18D0619  
**Date Received:** 04/25/2018

**QC Summary**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD RPD	RPD Limit Qual
<b>Batch 1804245 - E300.0 (2.1)</b>								
<b>Blank (1804245-BLK1)</b>								
Chloride	ND	1.0	mg/L					
Fluoride	ND	0.50	mg/L					
Nitrogen, Nitrate (As N)	ND	0.50	mg/L					
Nitrogen, Nitrite (As N)	ND	0.10	mg/L					
Sulfate	ND	5.0	mg/L					
<b>LCS (1804245-BS1)</b>								
Chloride	12	1.0	mg/L	12.50	92	90-110		
Fluoride	2.0	0.50	mg/L	2.000	101	90-110		
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	95	90-110		
Nitrogen, Nitrite (As N)	2.3	0.10	mg/L	2.500	92	90-110		
Sulfate	12	5.0	mg/L	12.50	96	90-110		
<b>LCS Dup (1804245-BSD1)</b>								
Chloride	12	1.0	mg/L	12.50	94	90-110	2	10
Fluoride	2.0	0.50	mg/L	2.000	101	90-110	0.4	10
Nitrogen, Nitrate (As N)	4.9	0.50	mg/L	5.000	98	90-110	3	10
Nitrogen, Nitrite (As N)	2.4	0.10	mg/L	2.500	95	90-110	3	10
Sulfate	12	5.0	mg/L	12.50	98	90-110	3	10
<b>Matrix Spike (1804245-MS1)</b>								
<b>Source: 18D0613-08</b>				Prepared & Analyzed: 04/25/2018				
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120	
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	89	80-120	
<b>Matrix Spike (1804245-MS2)</b>								
<b>Source: 18D0625-01</b>				Prepared & Analyzed: 04/26/2018				
Nitrogen, Nitrate (As N)	5.0	0.50	mg/L	5.000	0.46	92	80-120	
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120	
<b>Matrix Spike (1804245-MS3)</b>								
<b>Source: 18D0614-01RE1</b>				Prepared & Analyzed: 04/26/2018				
Chloride	17		mg/L	12.50	6.4	88	80-120	
Sulfate	28		mg/L	12.50	18	85	80-120	
<b>Matrix Spike Dup (1804245-MSD1)</b>								
<b>Source: 18D0613-08</b>				Prepared & Analyzed: 04/25/2018				
Fluoride	3.7	0.50	mg/L	2.000	1.7	100	80-120	0.4
Nitrogen, Nitrate (As N)	4.7	0.50	mg/L	5.000	0.22	90	80-120	0.6
<b>Matrix Spike Dup (1804245-MSD2)</b>								
<b>Source: 18D0625-01</b>				Prepared & Analyzed: 04/26/2018				
Nitrogen, Nitrate (As N)	5.1	0.50	mg/L	5.000	0.46	92	80-120	0.2
Nitrogen, Nitrite (As N)	2.2	0.10	mg/L	2.500	ND	88	80-120	0.4
<b>Matrix Spike Dup (1804245-MSD3)</b>								
<b>Source: 18D0614-01RE1</b>				Prepared & Analyzed: 04/26/2018				
Chloride	18		mg/L	12.50	6.4	89	80-120	0.6
Sulfate	29		mg/L	12.50	18	86	80-120	0.6



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# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Phoenix

4625 East Cotton Ctr Blvd

Suite 189

Phoenix, AZ 85040

Tel: (602)437-3340

[TestAmerica Job ID: 550-101943-1](#)

Client Project/Site: 18D0619

For:

Turner Laboratories, Inc.

2445 North Coyote Drive

Suite 104

Tucson, Arizona 85745

Attn: Kevin Brim

Authorized for release by:

5/16/2018 12:23:25 PM

Ken Baker, Project Manager II

(602)659-7624

[ken.baker@testamericainc.com](mailto:ken.baker@testamericainc.com)

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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# Definitions/Glossary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

## Qualifiers

### GC Semi VOA

Qualifier	Qualifier Description
Q9	Insufficient sample received to meet method QC requirements.

## Glossary

### Abbreviation **These commonly used abbreviations may or may not be present in this report.**

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

**Job ID: 550-101943-1**

**Laboratory: TestAmerica Phoenix**

## Narrative

**Job Narrative  
550-101943-1**

## Comments

No additional comments.

## Receipt

The sample was received on 4/27/2018 10:50 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.8° C.

## GC Semi VOA

Method(s) 8015D: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate/sample duplicate (MS/MSD) associated with preparation batch 550-145985 and analytical batch 550-146884. Affected samples have been added a Q9 qualifier.  
18D0619-01 (550-101943-1)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Organic Prep

Method(s) 3510C: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with 3510C.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

## Sample Summary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
550-101943-1	18D0619-01	Water	04/23/18 15:55	04/27/18 10:50

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TestAmerica Phoenix

## Detection Summary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

**Client Sample ID: 18D0619-01**

**Lab Sample ID: 550-101943-1**

Analyte	Result	Qualifier	RL	Unit	Dil Fac	D	Method	Prep Type
ORO (C22-C32)	0.21	Q9	0.20	mg/L	1		8015D	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Phoenix

# Client Sample Results

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

**Client Sample ID: 18D0619-01**

**Lab Sample ID: 550-101943-1**

**Matrix: Water**

Date Collected: 04/23/18 15:55  
Date Received: 04/27/18 10:50

## Method: 8015D - Diesel Range Organics (DRO) (GC)

Analyte	Result	Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	0.21	Q9	0.20	mg/L	04/30/18 14:16	05/10/18 23:29		1
DRO (C10-C22)	ND	Q9	0.10	mg/L	04/30/18 14:16	05/10/18 23:29		1
Surrogate	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
<i>o-Terphenyl (Surr)</i>	79		10 - 150			04/30/18 14:16	05/10/18 23:29	1

## **Surrogate Summary**

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

## **Method: 8015D - Diesel Range Organics (DRO) (GC)**

## Matrix: Water

### **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	OTPH				
		(10-150)				
550-101943-1	18D0619-01	79				
LCS 550-145985/2-A	Lab Control Sample	79				
LCSD 550-145985/3-A	Lab Control Sample Dup	79				
MB 550-145985/1-A	Method Blank	65				

## **Surrogate Legend**

**OTPH = o-Terphenyl (Surr)**

# QC Sample Results

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

## Method: 8015D - Diesel Range Organics (DRO) (GC)

**Lab Sample ID:** MB 550-145985/1-A

**Matrix:** Water

**Analysis Batch:** 146884

**Client Sample ID:** Method Blank

**Prep Type:** Total/NA

**Prep Batch:** 145985

Analyte	MB Result	MB Qualifier	RL	Unit	D	Prepared	Analyzed	Dil Fac
ORO (C22-C32)	ND		0.20	mg/L		04/30/18 14:15	05/11/18 11:16	1
DRO (C10-C22)	ND		0.10	mg/L		04/30/18 14:15	05/11/18 11:16	1
Surrogate	MB %Recovery	MB Qualifier	Limits			Prepared	Analyzed	Dil Fac
<i>o-Terphenyl (Surr)</i>	65		10 - 150			04/30/18 14:15	05/11/18 11:16	1

**Lab Sample ID:** LCS 550-145985/2-A

**Matrix:** Water

**Analysis Batch:** 146884

**Client Sample ID:** Lab Control Sample

**Prep Type:** Total/NA

**Prep Batch:** 145985

Analyte		Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	
ORO (C22-C32)		1.60	1.59		mg/L		99	69 - 107
DRO (C10-C22)		0.400	0.450		mg/L		113	42 - 133
Surrogate		LCS %Recovery	LCS Qualifier	Limits				Limits
<i>o-Terphenyl (Surr)</i>		79		10 - 150				

**Lab Sample ID:** LCSD 550-145985/3-A

**Matrix:** Water

**Analysis Batch:** 146884

**Client Sample ID:** Lab Control Sample Dup

**Prep Type:** Total/NA

**Prep Batch:** 145985

Analyte		Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.		RPD	
ORO (C22-C32)		1.60	1.59		mg/L		100	69 - 107	0	20
DRO (C10-C22)		0.400	0.447		mg/L		112	42 - 133	1	22
Surrogate		LCSD %Recovery	LCSD Qualifier	Limits				Limits	RPD	Limit
<i>o-Terphenyl (Surr)</i>		79		10 - 150						

TestAmerica Phoenix

# QC Association Summary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

## GC Semi VOA

### Prep Batch: 145985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	3510C	
MB 550-145985/1-A	Method Blank	Total/NA	Water	3510C	
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

### Analysis Batch: 146884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
550-101943-1	18D0619-01	Total/NA	Water	8015D	145985
MB 550-145985/1-A	Method Blank	Total/NA	Water	8015D	145985
LCS 550-145985/2-A	Lab Control Sample	Total/NA	Water	8015D	145985
LCSD 550-145985/3-A	Lab Control Sample Dup	Total/NA	Water	8015D	145985

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# Lab Chronicle

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

**Client Sample ID: 18D0619-01**

**Lab Sample ID: 550-101943-1**

**Matrix: Water**

**Date Collected: 04/23/18 15:55**

**Date Received: 04/27/18 10:50**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			145985	04/30/18 14:16	REM	TAL PHX
Total/NA	Analysis	8015D		1	146884	05/10/18 23:29	TC1	TAL PHX

**Laboratory References:**

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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TestAmerica Phoenix

# Accreditation/Certification Summary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

## Laboratory: TestAmerica Phoenix

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Arizona	State Program	9	AZ0728	06-09-18
Analysis Method	Prep Method	Matrix	Analyte	

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TestAmerica Phoenix

## Method Summary

Client: Turner Laboratories, Inc.  
Project/Site: 18D0619

TestAmerica Job ID: 550-101943-1

Method	Method Description	Protocol	Laboratory
8015D	Diesel Range Organics (DRO) (GC)	SW846	TAL PHX
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL PHX

**Protocol References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

**Laboratory References:**

TAL PHX = TestAmerica Phoenix, 4625 East Cotton Ctr Blvd, Suite 189, Phoenix, AZ 85040, TEL (602)437-3340

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TestAmerica Phoenix

## SUBCONTRACT ORDER

Turner Laboratories, Inc.

18D0619  
101943SENDING LABORATORY:

Turner Laboratories, Inc.  
 2445 N. Coyote Drive, Ste #104  
 Tucson, AZ 85745  
 Phone: 520.882.5880  
 Fax: 520.882.9788  
 Project Manager: Kevin Brim

RECEIVING LABORATORY:

TestAmerica Phoenix  
 4625 East Cotton Center Boulevard Suite 189  
 Phoenix, AZ 85540  
 Phone :(602) 437-3340  
 Fax:  
 Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
-01			
Sample ID: 18D0619-01 Drinking Water Sampled:04/23/2018 15:55	04/30/2018 15:55	8015D Sub	8015D DRO and ORO Paramters Only
Containers Supplied:			

8015D Sub  
 o-Terphenyl  
 C10-C32 (Total)  
 C22-C32 (Oil Range Organics)  
 C10-C22 (Diesel Range Organics)  
 C6-C10 (Gasoline Range Organics)



TA-PHX

3,8' L UPS GR

Released By

41263118

Date

Received By

Released By

Date

Received By

Date

## Login Sample Receipt Checklist

Client: Turner Laboratories, Inc.

Job Number: 550-101943-1

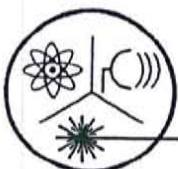
**Login Number:** 101943

**List Source:** TestAmerica Phoenix

**List Number:** 1

**Creator:** Gravlin, Andrea

Question	Answer	Comment	
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True		1
The cooler's custody seal, if present, is intact.	True		2
Sample custody seals, if present, are intact.	True		3
The cooler or samples do not appear to have been compromised or tampered with.	True		4
Samples were received on ice.	True		5
Cooler Temperature is acceptable.	True		6
Cooler Temperature is recorded.	True		7
COC is present.	True		8
COC is filled out in ink and legible.	True		9
COC is filled out with all pertinent information.	True		10
Is the Field Sampler's name present on COC?	True		11
There are no discrepancies between the containers received and the COC.	True		12
Samples are received within Holding Time (excluding tests with immediate HTs)	True		13
Sample containers have legible labels.	True		14
Containers are not broken or leaking.	True		15
Sample collection date/times are provided.	True		
Appropriate sample containers are used.	True		
Sample bottles are completely filled.	True		
Sample Preservation Verified.	True		
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True		
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True		
Multiphasic samples are not present.	True		
Samples do not require splitting or compositing.	True		
Residual Chlorine Checked.	False	Check done at department level as required.	



## Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: [www.radsafe.com](http://www.radsafe.com)

(480) 897-9459

FAX (480) 892-5446

### Radiochemical Activity in Water (pCi/L)

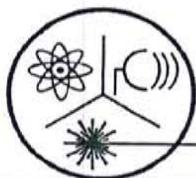
Turner Laboratories  
2445 N. Coyote Drive, Ste. 104  
Tucson, AZ 85745

Sampling Date: April 23, 2018  
Sample Received: May 01, 2018  
Analysis Completed: May 22, 2018

Sample ID	Gross Alpha Activity Method 600/00-02 (pCi/L)	Uranium Activity Method ASTM D6239 (pCi/L)	Adjusted Gross Alpha (pCi/L)	Radium 226 Activity Method GammaRay HPGE (pCi/L)	Radium 228 Activity Method GammaRay HPGE (pCi/L)	Total Radium (pCi/L)
18D0619-01	17.7 ± 0.9	12.9 ± 1.2	4.8 ± 1.5	3.1 ± 0.3	3.1 ± 0.4	6.2 ± 0.5

Date of Analysis	5/2/2018	5/21/2018	5/21/2018	5/4/2018	5/4/2018	5/4/2018
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*Alt 2. retest*  
\_\_\_\_\_  
Robert L. Metzger, Ph.D., C.H.P.      Date \_\_\_\_\_  
Laboratory License Number AZ0462



## Radiation Safety Engineering, Inc.

3245 N. WASHINGTON ST. • CHANDLER, ARIZONA 85225-1121

Website: [www.radsafe.com](http://www.radsafe.com)

(480) 897-9459

FAX (480) 892-5446

### Isotopic Uranium Analysis

Turner Laboratories  
2445 N. Coyote Drive, Ste. 104  
Tucson, AZ 85745

Sampling Date: April 23, 2018

Sample Received: May 01, 2018

Uranium Analysis Date: May 21, 2018

Sample No.	$^{238}\text{U}$	$^{235}\text{U}$	$^{234}\text{U}$	Total	
18D0619-01	$6.0 \pm 0.6$	$0.280 \pm 0.004$	$6.6 \pm 0.6$	$12.9 \pm 1.2$	Activity (pCi/L)
	$17.9 \pm 1.7$	$0.131 \pm 0.002$	$0.00106 \pm 0.00010$	$18.0 \pm 1.7$	Content ( $\mu\text{g}/\text{L}$ )
<b>Comments:</b>					

*Metzger*  
Robert L. Metzger, Ph.D., C.H.P.      5/22/2018  
Date  
Laboratory License Number AZ0462

Arizona Department of Environmental Quality  
**Drinking Water Radionuclides-Adjusted Gross Alpha, Radium 226 & 228, Uranium Analysis Report**  
\*\*\*Samples To Be Taken At Entry Point Into Distribution System (EPDS) Only\*\*\*

PWS ID#: AZ04 \_\_\_\_\_ PWS Name: \_\_\_\_\_

April 23, 2018 15:55 (24 hour clock)  
Sample Date Sample Time Owner/Contact Person

Owner/Contact Fax Number Owner/Contact Phone Number

Sample Collection Point  
 EPDS # \_\_\_\_\_

**Compliance Sample Type:**

- Reduced Monitoring
- Quarterly
- Composite of four quarterly samples

Date Q1 collected: \_\_\_\_\_  
Date Q2 collected: \_\_\_\_\_  
Date Q3 collected: \_\_\_\_\_  
Date Q4 collected: \_\_\_\_\_

**\*\*\*RADIOCHEMICAL ANALYSIS\*\*\***

>>>To be filled out by laboratory personnel<<<

**\*\*\*Combined Uranium must be reported in micrograms per liter\*\*\***

Analysis Method	MCL	Reporting Limit	Contaminant Name	Cont. Code	Analyses Run Date	Result	Exceed MCL
	15 pCi/L		Adjusted Gross Alpha	4000	5/21/2018	4.8 ± 1.5	
600/00-02		3 pCi/L	Gross Alpha	4002	5/2/2018	17.7 ± 0.9	
7500 - Rn			Radon	4004			
ASTM D6239	30 µg/L	1 µg/L	Combined Uranium	4006	5/21/2018	18.0 ± 1.7 µg/L	
			Uranium 234	4007	5/21/2018	0.00106 ± 0.00010	
			Uranium 235	4008	5/21/2018	0.131 ± 0.002	
			Uranium 238	4009	5/21/2018	17.9 ± 1.7	
	5 pCi/L	1 pCi/L	Combined Radium (226,228)	4010	5/4/2018	6.2 ± 0.5	X
GammaRay HPGE		1 pCi/L	Radium 226	4020	5/4/2018	3.1 ± 0.3	
GammaRay HPGE		1 pCi/L	Radium 228	4030	5/4/2018	3.1 ± 0.4	

**\*\*\*LABORATORY INFORMATION\*\*\***

>>>To be filled out by laboratory personnel<<<

Specimen Number: RSE60312

Lab ID Number: AZ0462

Lab Name: Radiation Safety Engineering, Inc.

Printed Name and Phone Number of Laboratory Contact: Robert L. Metzger, Ph.D., C.H.P. (480) 897-9459

Comments: 18D0619-01

Authorized Signature: *Robert L. Metzger*

Date Public Water System Notified:

## SUBCONTRACT ORDER

Turner Laboratories, Inc.

18D0619

SENDING LABORATORY:

Turner Laboratories, Inc.  
 2445 N. Coyote Drive, Ste #104  
 Tucson, AZ 85745  
 Phone: 520.882.5880  
 Fax: 520.882.9788  
 Project Manager: Kevin Brim

RECEIVING LABORATORY:

Radiation Safety Engineering, Inc.  
 3245 N. Washington St.  
 Chandler, AZ 85225-1121  
 Phone : (480) 897-9459  
 Fax: (480) 892-5446  
 Please CC Kevin Brim Kbrim@turnerlabs.com

Analysis	Expires	Laboratory ID	Comments
<b>Sample ID: 18D0619-01 Drinking Water Sampled:04/23/2018 15:55</b>			
Radiochemistry, Gross Alpha	10/20/2018 15:55		Analyze Uranium and Adjusted Alpha if G. Alpha is > 12
Radiochemistry, Radium 226/228	05/23/2018 15:55		
<i>Containers Supplied:</i>			

*# 60312**[Signature]*  
Released By4/30/18  
Date16:00  
ups

Received By

4/30/18  
Date

16:00

Released By

Date

Received By

Date

**APPENDIX D**

**Well Completion Documentation**

## PIPE TALLY

Project Name: FCI PTF	Project No.: 1Q4681-007
Well No.: WB-04	Date: 2/23/16
Location: Florence, AZ	Pipe Tally for: HAWK
Total Depth:	Geologist: S. Hirsch / S. Kanay

Type of Connections:  Welded  T+C  Flush Thread  Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD, CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
1	✓	10.35	0.02	0.35	End cap				
2	✓	20.02	20.37	4" PVC Blank					
3	✓	20.03	40.40	↓					
4	✓	10.02	50.44	4" PVC Screen					
5	✓	20.02	70.46	4" PVC Blank					
6	✓	20.01	90.47						
7	✓	20.01	110.48						
8	✓	20.01	130.49						
9	✓	20.03	150.52						
10	✓	20.02	170.54	↓					
11	✓	10.03	180.57	↓					
12	✓	10.03	190.62	PVC Screen					
13	✓	20.02	210.64	PVC Blank					
14	✓	20.02	230.66						
15	✓	20.02	250.68						
16	✓	20.02	270.70						
17	✓	20.01	290.71						
18	✓	20.01	310.72						
19	✓	10.03	320.75	↓					
20	✓	10.05	330.80	PVC Screen					
21	✓	20.03	350.83	PVC Blank					
22	✓	20.03	370.86						
23	✓	20.03	390.89						
24	✓	20.02	410.91						
25	✓	20.03	430.94						
26	✓	20.03	450.97						
27	✓	10.04	461.01	↓					
28	✓	10.04	471.05	PVC Screen					
29	✓	20.03	491.08	PVC Blank					
30	✓	20.02	511.10	↓					

## Notes:

A centralizer at bottom of joint  
4# distance of centralizer from  
bottom of joint  
centralizes every 40'

## SUMMARY OF TALLY

Total Length tallied:	
Casing Stick-Up:	0.00 ft
Length of Casing Cut-Off:	—
Bottom of Well:	—
Screened Interval:	—
Total Screen in Hole:	—

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing  
 Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing  
 Electrical Resistivity Tomography (ERT)

HALEY ALDRICH

## PIPE TALLY

Project Name.: FCI PTF	Project No.: 129657-007
Well No.: WB-04	Date: 2/22/18
Location: Florence, AZ	Pipe Tally for S. Hensel / S. Kenney
Total Depth:	Geologist: WB-04

Type of Connections:  Welded  T+C  Flush Thread  Other

Pipe	✓	Length (ft)	Length Σ (ft)	Pipe Type	Dist. from sensor bottom to bottom of pipe (feet)	Sensor Type (ACD/CS, ERT)	Sensor ID	Wire Lead ID	Depth of Sensor (feet bgs)
31	✓	20.02	531.12	RVC Blank					
32	✓	20.02	551.14						
33	✓	20.03	571.17						
34	✓	20.02	591.19						
35	✓	10.03	601.22						
36	✓	10.04	611.26	RVC Casing					
37	✓	20.03	631.29	RVC Blank					
38	✓	20.03	651.32						
39	✓	20.03	671.35						
40	✓	5.02	676.37						
41	✓	0.43	676.80	SS1.6 spaced					
42	✓	28.80	705.62	Fiberglass					
43	✓	28.81	734.43						
44	✓	28.83	763.26						
45	✓	28.87	792.07						
46	✓	28.83	820.90						
47	✓	28.87	849.77						
48	✓	28.88	878.65						
49	✓	28.88	907.53		21.44/24.44 ACD	2/1			275' / 372'
50	✓	28.82	936.35						
51	✓	28.73	965.08			2/1			
52	✓	28.84	993.92						
53	✓	28.80	1022.72						
54	✓	28.82	1051.54						
55	✓	28.82	1080.36						
56	✓	28.81	1109.17						
57	✓	28.93	1138.1						
58	✓	28.83	1166.93						
59	✓	10.16	1177.09						
60	✓	2.16		Temp Fiberglass					

## Notes:

\*# centralizer distance from bottom of joint.  
 Centralizer every 40 feet  
 \* centralizer at bottom of joint

## SUMMARY OF TALLY

Total Length tallied:	
Casing Stick-Up:	2.00 ft
Length of Casing Cut-Off:	
Bottom of Well:	
Screened Interval:	
Total Screen in Hole:	

Sensor Types: Annular Conductivity Device (ACD), installed as pairs with 3 ft spacing  
 Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing  
 Electrical Resistivity Tomography (ERT)

\*60/61 used as jump pieces to land casing from rig dock

HALEY  
ALDRICH

PIPE TALLY

Project Name.: FCI PTF	Project No.: 129687-007
Well No.: WB-04	Date: 21/23/18
Location: Florence, AZ	Pipe Tally for: WB-04 lower
Total Depth:	Geologist: S. Larson

Type of Connections:  Welded  T+C  Flush Thread  Other

### Notes:

---

**SUMMARY OF TALLY**

---

Total Length tallied:

380

#### Casing Stick-Up:

### Length of Casing Cut-Off:

**Bottom of Well:**

Screened Interval:

Total Screen in Hole:

### Sensor Types:

Conductivity Sensor (CS) 4 sensors with sing lead 20 ft spacing

#### **Electrical Resistivity Tomography (ERT)**

## Electrical Resistivity Tomography (ERT)

- HALEY ALDRICH

## Casing Layout

Project Name.: Florence Copper INC				Project No.: 129687-007								
Well No.: WB-04				Date: 2/22/2018								
Location: Florence AZ				Layout for: Lower								
Total Depth:				Geologist: T. SNOW, C. Giusti, G. Foushee								
Pipe Length	Depth BGS	Pipe Length	Depth BGS	Pipe Length	Depth BGS	Sensor Type	Sensor ID	Pipe #	Distance from Bottom of Sensor to Top of Pipe	Depth of Sensor (BGS)		
20.03	23	784.19		28.83	46	354.19		ACD	2	49	21.44	275.00
		804.22		28.81	45	383.02		ACD	1	49	24.44	272.00
20.03	22	824.25		28.83	44	411.83						
20.03	21	844.28		28.81	43	440.66						
10.05	20	854.33		28.82	42	469.47						
10.03	19	864.36		0.43	41	498.29						
20.01	18	884.37		5.02	40	498.72						
20.01	17	904.38		20.03	39	503.74						
20.02	16	924.40		20.03	38	523.77						
20.02	15	944.42		20.02	37	543.80						
20.02	14	964.44		10.04	36	563.82						
20.02	13	984.46		10.03	35	573.86						
10.05	12	994.51		20.02	34	583.89						
10.03	11	1004.54		20.03	33	603.91						
20.02	10	1024.56		20.02	32	623.94						
20.03	9	1044.59		20.02	31	643.96						
20.01	8	1064.60		20.02	30	663.98						
20.01	7	1084.61		20.03	29	684.00						
20.01	6	1104.62		10.04	28	704.03						
20.02	5	1124.64		10.04	27	714.07						
10.04	4	1134.68		20.03	26	724.11						
20.03	3	1154.71		20.03	25	744.14						
20.02	2	1174.73		20.02	24	764.17						
0.35	1	1175.08				784.19						

Notes:

# ESTIMATED ANNULAR MATERIAL RECORD

Project Name: FCI PTF  
Well No.: VB-04

Project #: 129687-907  
Geologist: S. Hensel / S. Kenney

Date: 2/23/18 - 2/24/18

## ANNULAR VOLUME CALCULATIONS

Total Depth of Borehole [T]: 1219 feet

Borehole Diameter [D]: 12.25 inches

Screen Length [L<sub>s</sub>]: 75.0 feet

Screen Diameter [d<sub>s</sub>]: 4" inches

Casing Length [L<sub>c</sub>]: 62.9 feet

Casing Diameter [d<sub>c</sub>]: 4" inches

Total Cased Depth: 1175.12 feet

Rat Hole Volume [R=(D<sup>2</sup>) 0.005454\*L]: 24.97 Ft<sup>3</sup> 35.91

Rat Hole Length [L<sub>r</sub>]: 43.88 feet

Camera Tube Length [L<sub>ct</sub>]: - feet

Camera Tube Diameter [d<sub>ct</sub>]: - inches

Screen Annular Volume (A<sub>s</sub>): (D<sup>2</sup>-d<sub>s</sub><sup>2</sup>) 0.005454 = 0.73 Ft<sup>3</sup>/Lin. Ft

Casing Annular Volume (A<sub>c</sub>): (D<sup>2</sup>-d<sub>c</sub><sup>2</sup>) 0.005454 = 0.73 Ft<sup>3</sup>/Lin. Ft

Casing/Cam.Tube Annular Volume (A<sub>c+ct</sub>): (D<sup>2</sup>-d<sub>c</sub><sup>2</sup>-d<sub>ct</sub><sup>2</sup>) 0.005454 = - Ft<sup>3</sup>/Lin. Ft

## EQUATIONS

2,700 lbs. Silica Sand = 1 cubic yard = 27 cubic feet

Bentonite Sack = 0.69 ft<sup>3</sup>

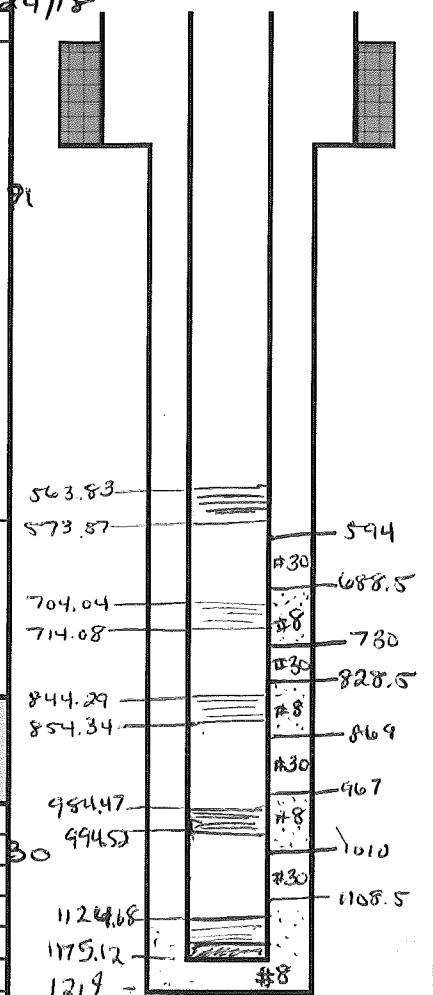
<sup>1</sup> Volume of bag (Ft<sup>3</sup>) = bag weight/100

Silica Sand Super Sack = 3000 lbs.

<sup>2</sup> Calculated depth = Previous Calculated depth - (v/A)

No.	✓	Weight of Bag (lbs.)	Volume of Bag <sup>1</sup> (V) (ft <sup>3</sup> )	Total Vol. of Bags (ft <sup>3</sup> )	Calculated Depth <sup>2</sup> (ft bsl)	Tagged Depth (ft bsl)	Comments
1	✓	3000	30	30	1141.03	--	#8 gravel 1200-13
2	✓	3000	30	60	1141.2	--	#8 gravel 1161.58/1130
3	✓	3000.2250	30.225	90.825	1111	1114.5	#8 gravel 1099'
	✓	166.7	.667	86.5	1109	1109	#8 gravel 5gal (10)
					1108.5		Swab 1115'-1145' x 15 min
					1108.5	11	x 10 min
4	✓	3000	30	116.5	1068	1076	#30 sand 10.37

\*unable to get solid tag due to thick mud. Perl. Condreva, will add another super sack and tag again, hoping to push out more mud



2 /

## ESTIMATED ANNULAR MATERIAL RECORD (Continued)

Project Name: FC1 PTF

Project No.: 129687-007

Geologist: S. Kaney / C. Grout

Well No.: W3-04

Date: 2/28/18

No.	✓	Weight of Bag (lbs.)	Volume of Bag <sup>1</sup> (v) (ft <sup>3</sup> )	Total Vol. of Bags (ft <sup>3</sup> )	Calculated Depth <sup>2</sup> (ft bbls)	Tagged Depth (ft bbls)	Comments
5	✓	3000	30	146.5	1027.1635	1039	#30 sand tremmie @ 1005
6	✓	1500	15	161.5	1066.5 / 104.5	1020	#30 sand 1/2 ss.
7	✓	750	7.5	169	996.3 / 109.8	1010.0	#30 sand 1/4 ss.
8	✓	2270.1500	22.5	101.5	765.7 / 771.2	-	#8 sand CG
8	✓	1500	15	184	975.6 / 994.3	994	#8 sand 1/2 ss tremie @ 974
9	✓	1500	15	199	955.1 / 953.5	982	#8 sand 1/2 ss
10	✓	750	7.5	206.5	944.9 / 971.8	978	#8 sand 1/4 ss tremie @ 943
11	✓	750	7.5	214	934.7 / 967.4	967	#8 sand 1/4 ss
					967		Swab 15 min Hgch 980-1000
12	✓	3000	30	244	892.8 / 926	-	
13	✓	3000	30	274	851.7 / 885	890	2 ss #8 sand added #30 tremmie at 848
14	✓	1000	10	284	* 853 / 878	878	#30 sand 1/3 ss
15	✓	1000	10	294	* 836.2 / 870.3	869	#30 sand 1/3 ss
16	✓	3000	30	324	* 813 / 846	844	#8 ss tremmie at 819
17	✓	2000	20	344	* 798 / 828.6	825	#8 2/3 ss
					833.5		Swab 835' - 865' x 15 min
					833	"	x 10 min
18	✓	66.7	0.667	349 **	794.9 / 829.4	828.5	#8 - 5 gal buckets (18)
19	✓	3000	30	379	* 771.4 / 805.5	-	#30 sand ss.
20	✓	3000	30	409	* 748.9 / 782.5	790	#30 sand ss.
21	✓	3000	30	439	* 723.7 / 770	-	#30 sand ss. tremie @ 724
22	✓	1500	15	454	707.1 / 770	-	CG

Notes: \* after Tag after nearly 6 hours of settling and multiple tags indicating it is likely still slowly settling. See field notes for more info

\*\* based on 16 inch borehole from Caliper (or 1.3 ft<sup>3</sup>/linear foot)

\*\* based on 17 inch borehole from Caliper (or 1.5 ft<sup>3</sup>/linear foot)

2) # / # - calculated depth base o. - last tagged depth

calculated depth based on  
last calculated depth

1.5  
3.6      755

3 /

ESTIMATED ANNULAR MATERIAL RECORD (Continued)							
Project Name: FCI		Project No.: 129687-007		Geologist: C. Finsta / S. Lamer / S. Hensel			
No.	✓	Weight of Bag (lbs.)	Volume of Bag <sup>1(v)</sup> (ft <sup>3</sup> )	Total Vol. of Bags (ft <sup>3</sup> )	Calculated Depth <sup>2</sup> (ft bbls)	Tagged Depth (ft bbls)	Comments
22	✓	3000	30	469 ft	708.9 / 750	731	#30 SAND
23	✓	66.7	0.667	471	706.16 / 728.2	730	#30 SAND - 5 gal (x3)
24	✓	3000	30	501	665, 689	698	#8 SAND TREMIE & 662.5
25	✓	66.7	0.667	508	655.5 / 680.4	689.5	#8 SAND - 5 gal (x16)
						688.5	Swab 695-725 x 15 min
26	✓	3000	30	538	614.5 / 647.5	644	#30 SAND TREMIE & 599
27	✓	3000	30	548	593.5 / 606.5	643 / 648	#30 SAND
28	✓	3000	30	598	566.5 / 621 *	624.5	#30 Sand
29	✓	3000	30	628	539.5 / 571.5*	594	#30 sand Tremie at 569
30	✓	3000	30	658	516.5 / 571*	-	#8 Sand Tremie at 504
31	✓	3000	30	688	493.5 / 548*	546.5	#8 Sand
32	✓	3000	30	718	470.5 / 523.5*	-	#8 Sand Tremie at 473
33	✓	3000	30	748	447.5 / 500.5*	497	#8 Sand
					498	Swab 555'- 585' x 15 min	
					498	Swab " x 10 min	
34	✓				502 / 497		5-gal Pel-Plug Bentonite
35	✓	50	0.5	753	5.00 / 490	492	#60 sand 50 lbs x 10
36	✓	50	0.5	758	487	447	#60 sand 50 lbs back x 10
37	✓	=	=	=	4460	486	5-gal bucket Pel-Plug Bentonite
38	✓	=	=	=	0	47	Type V cement

Notes:

- \* based on 17" borehole from caliper log (1.5 ft<sup>3</sup>/lin ft)
- \* based on 15" borehole from caliper log (1.1 ft<sup>3</sup>/linear foot)
- \* based on 16" borehole from caliper log (1.3 ft<sup>3</sup>/lin ft)

26 w/yd calc

28 needed (0.7%)



54375191

Plant:	Begin Loading:	To Job:	Arrive Job:	Start Unload:	Finish Unload:	Leave Job:	Return Plant:
PJL4444	1145	114	1678	1237			

Customer Code: Customer Name: Customer Job Number: Order Code / Date:  
 3181157 FLORENCE CORDER, INC. FLORENCE WELL 6477 01/12/18  
 Project Code: Project Name: Project P.O. Number: Order P.O. Number:  
 4169304 FLORENCE WELL NO. NO PO  
 Ticket Date: Delivery Address: Map Page: Map/Row/Column:  
 01/12/18 1575 W HUNT HIGHWAY CLEAN DRUM/BATCH RECORDS/  
 Delivery Instructions: PIN: PINMY201  
 HUNT HWY & E/ FELIX RD - MAX SLUMP \* Dispatcher:  
 Delivery instructions to customer location Taylor Co. 1575 W Hunt Hwy, Florence, AZ 85132  
 Ticket Number: 44457015

Due On Job:	Slump:	Truck Number:	Driver Number:	Driver Name:	End Use:
12:30	6.00	10065248	410512	DENDY, BRUCE E.	SUJ BLDG: OTHER

LOAD QUANTITY	CUMULATIVE QUANTITY	ORDERED QUANTITY	MATERIAL CODE	PRODUCTION DESCRIPTION	UOM	UNIT PRICE	AMOUNT
7.00	7.00	7.00	1323049	TYPE 11/V SLURRY 21 SK CMT/N YD3 LEGACY MATERIAL NO:			

ACIG/CYBOD/CEMEX/TO LOAD CODE CONCRETE TO OWNER'S ACCOUNTS	
1323049	TYPE 11/V SLURRY 21 SK CMT/N YD3
1327810	FUEL SURCHARGE ADJ
1202743	ENVIRONMENTAL FEE
1572332	FREIGHT_NON_TAXABLE_ARIZONA
	JAN 12 '18 11:42

<input type="checkbox"/> Cash	Check # / Auth Code:	Signature of Driver Receiving Cash:	Cash Received:	Total COD Order Amount to Collect Without Standby Charges:
<input type="checkbox"/> Check				
<input type="checkbox"/> Charge				

Comments:	WATER ADDED: _____ GAL      YARDS IN DRUM: _____ WHEN ADDED.
	SIGNATURE
	<b>CURB LINE CROSSED AT OWNER'S/AGENT'S REQUEST:</b>
	SIGNATURE
	<input type="checkbox"/> LOAD WAS TESTED BY: _____
	SIGNATURE

Notice: Our drivers will make every effort to place materials where the customer designates, but the Company assumes no responsibility for damages inside curb or property line. Customer agrees to the terms of sale and delivery and accepts concrete as is. Due to important factors which are out of our control after delivery, this Company will not accept any responsibility for the finished results. No credit for returned concrete. Buyers exceptions and claims shall be deemed waived unless made to us in writing within one business day after the receipt of materials.

SPECIAL TERMS: Any water added is at customers own risk. If water is added on job, concrete strength is no longer guaranteed. WARNING: Product may cause skin and/or eye irritation. CAUTION: Material may be hazardous to your safety and health. Please refer to the backside of this ticket for important safety handling information, and to the material safety data sheets for additional information.  
 AUTHORIZED SIGNATURE:

(X)



3451 LeTourneau  
Gillette, WY 82718  
307-682-5258

## Cementing Ticket

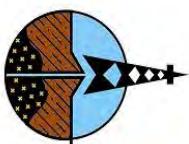
No. 1719

21379

Date <b>02-26-18</b>	Customer Order No.	Sect.	Twp.	Range	Truck Called Out <b>8:00</b>	On Location <b>8:30</b>	Job Began <b>11:00</b>	Job Completed <b>12:30</b>
Owner <b>Florance Copper Mine</b>			Contractor <b>Hydro Resources</b>			Charge To <b>Hydro West</b>		
Mailing Address			City			State		
Well No. & Form <b>West Bay 04</b>				Place <b>copper mine</b>		County <b>Pinal</b>	State <b>AZ</b>	
Depth of Well <b>1225</b>	Depth of Job <b>473</b>	Casing ( New ) Used	Size <b>4.5</b>	Weight	Size of Hole Amt. and Kind of Cement <b>12.25</b> <b>2/5</b>	Cement Left in casing by <b>0</b>	Request Necessity <b>0</b>	feet
Kind of Job <b>Production Well</b>				Drillpipe	( Rotary )	Tubing <b>2 7/8</b>	Cable	Truck No. <b>28983</b>
Price Reference No. <b>1210</b>	Remarks <b>safety meeting held</b> <b>rig up to tubing with hose and valve</b> <b>pump 5 bbls to clear tubing</b> <b>pump and mix 550 sks type 2/5 cement</b> <b>displace .5 bbl thru mixer</b> <b>rig down from tubing</b> <b>wash up in cellar</b> <b>good cement to surface</b>							
Total Charges <b>5,800.00</b>	<b>THANK YOU</b>							
Cementer <b>Bryan Hammond</b>	Lead Yield <b>1.38</b>	Lead Wt. <b>14.6</b>	Lead Water <b>6.8</b>	SV <b>135</b>				
Helper <b>Daniel Johnson</b>	Tall Yield	Tall Wt.	Lead Water	SV				
District <b>Gillette</b>	State <b>Wy</b>							
The above job was done under supervision of the owner, operator, or his agent whose signature appears below.								
_____ Agent of contractor or operator								
<b>Sales Ticket for Materials Only</b>								
QUANTITY SACKS	BRAND AND TYPE			PRICE	TOTAL			
16	<b>Crew subsistence</b>			<b>500</b>	<b>8,000.00</b>			
12	<b>Transportaton of cement</b>			<b>150</b>	<b>1,800.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
	<b>expected use 24.5 yds/ 470 sks</b>				<b>0.00</b>			
					<b>0.00</b>			
	<b>P.O. # 152614</b>				<b>0.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
					<b>0.00</b>			
Plugs					<b>0.00</b>			
Equipment # <b>28983</b>	HRS <b>1.5</b>	550	Handling & Dumping	<b>2.44</b>	<b>1,342.00</b>			
			Mileage		<b>0.00</b>			
			Sub Total		<b>16,942.00</b>			
			Discount					
			Sales Tax					
Signature of operator				Total				

**APPENDIX E**

**Geophysical Logs**



# Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	WB-04		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
<b>TYPE OF LOGS:</b> E-LOG MORE: <b>NAT. GAMMA</b>			OTHER SERVICES 3-ARM CALIPER TEMPERATURE FLUID RESISTIVITY SONIC DEVIATION
SEC	TWP	RGE	ELEVATION K.B. D.F. G.L.
PERMANENT DATUM	GROUND LEVEL	ABOVE PERM. DATUM	
LOG MEAS. FROM	DRILLING MEAS. FROM GROUND LEVEL		
DATE	2-22-18	TYPE FLUID IN HOLE	MUD
RUN No	1 & 2	MUD WEIGHT	N/A
TYPE LOG	E-LG - NAT. GAMMA	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	27.57 DEG. C
BTMLLOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	GEOVISTA E-LOG SN 4035
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	11:00 A.M.
RUN	BOREHOLE RECORD	CASING RECORD	
NO.	BIT	FROM TO	SIZE WGT. FROM TO
1	?	SURFACE 40 FT.	14 IN. STEEL SURFACE 40 FT.
2	12 1/4 IN.	TOTAL DEPTH	
3			
COMMENTS:			

Tool Summary:					
Date	2-22-18	Date	2-22-18	Date	2-22-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60mm SONIC
Tool SN	5543	Tool SN	4035	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900	Truck No	900	Truck No	900
Operation Check	2-21-18	Operation Check	2-21-18	Operation Check	2-21-18
Calibration Check	2-21-18	Calibration Check	2-21-18	Calibration Check	N/A
Time Logged	11:15 A.M.	Time Logged	12:05 P.M.	Time Logged	12:45 P.M.

Date	2-22-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	6002	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	2-21-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	1:45 P.M.	Time Logged		Time Logged	

## Additional Comments:

Caliper Arms Used: 15 IN.

Calibration Points: 8 IN. & 23 IN.

**Disclaimer:**

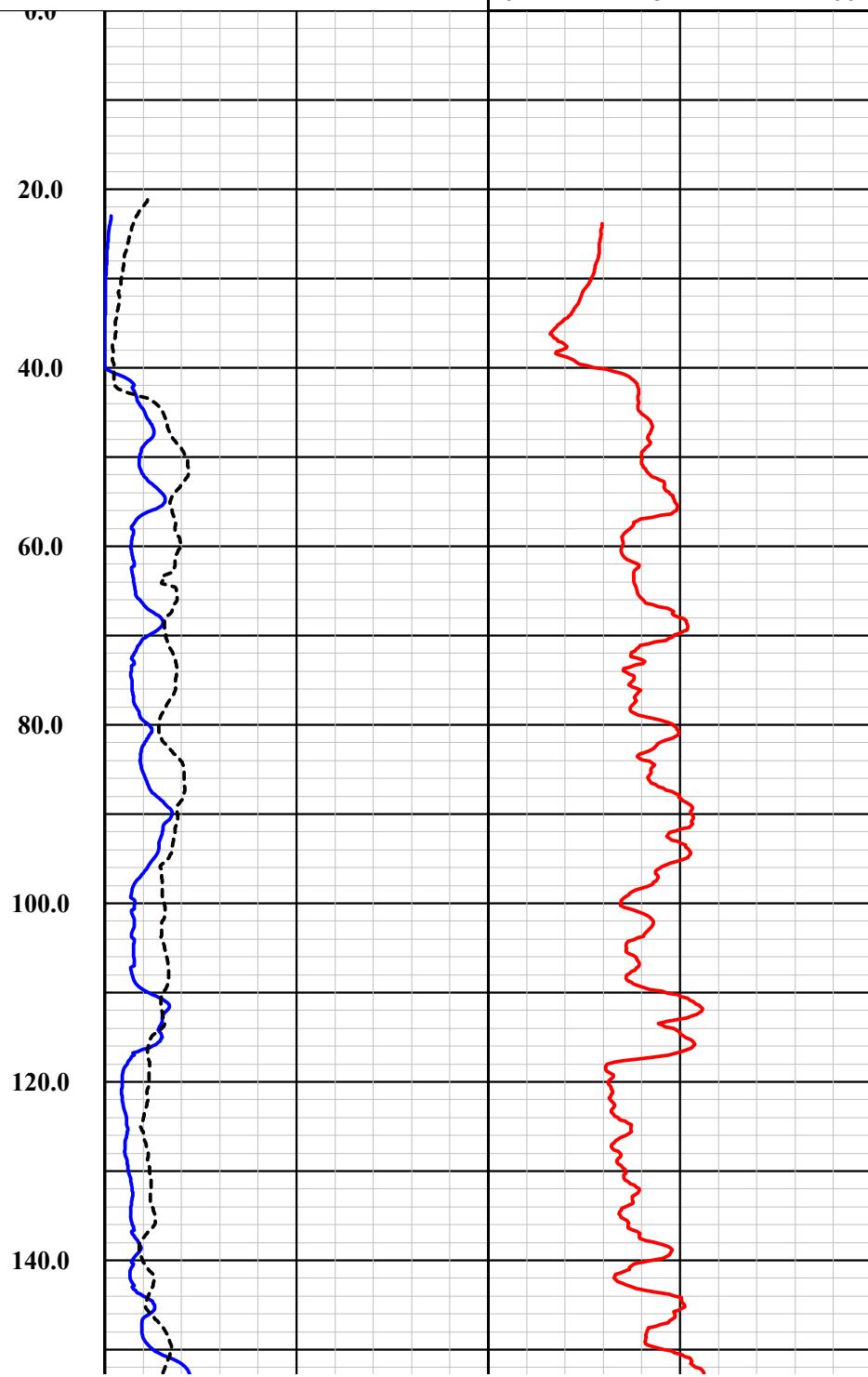
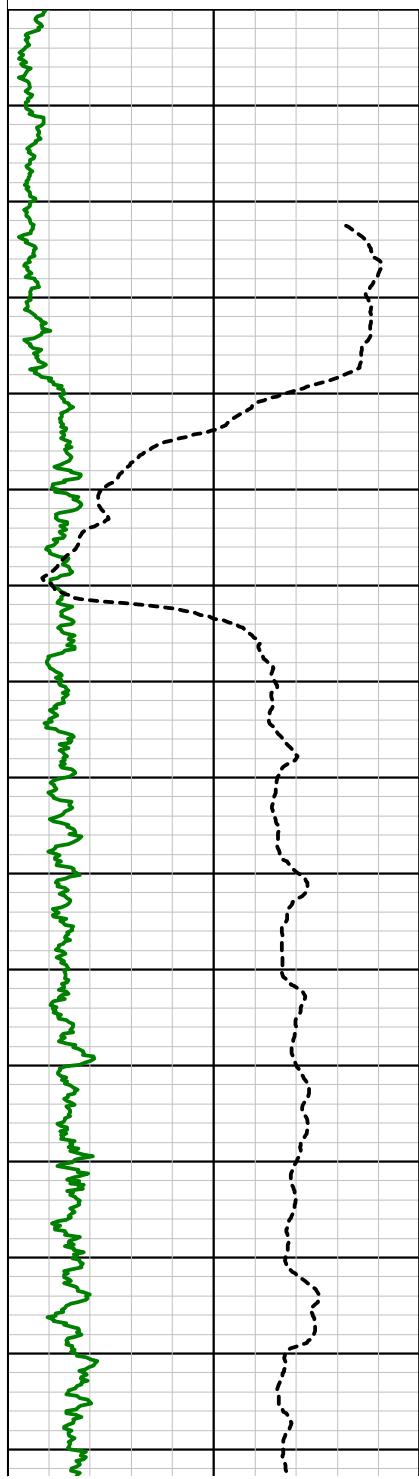
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

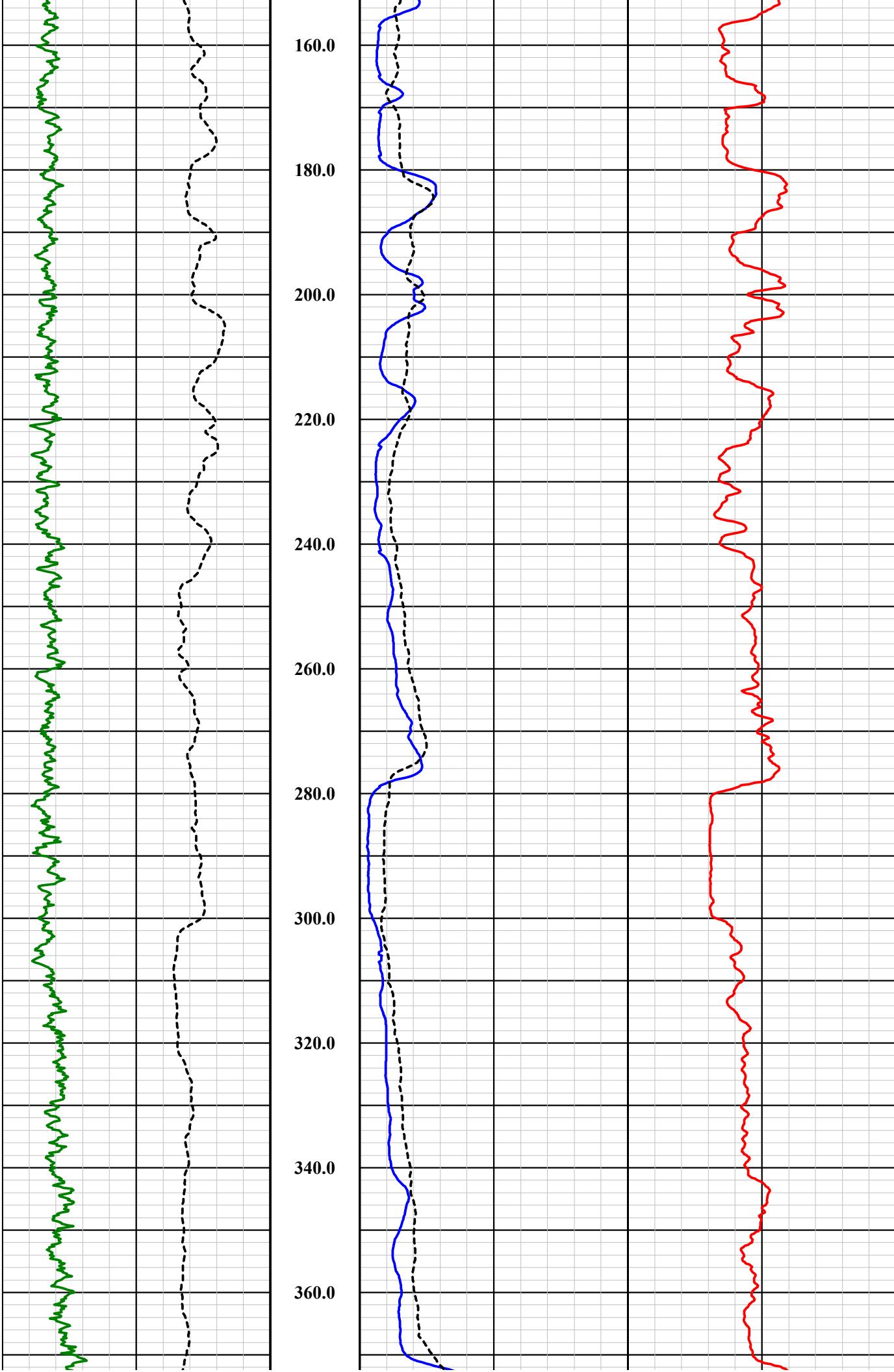
Nat. Gamma	Depth	16" NRes
0 API 400	1in:20ft	0 Ohm-m 400
SP		64" NRes

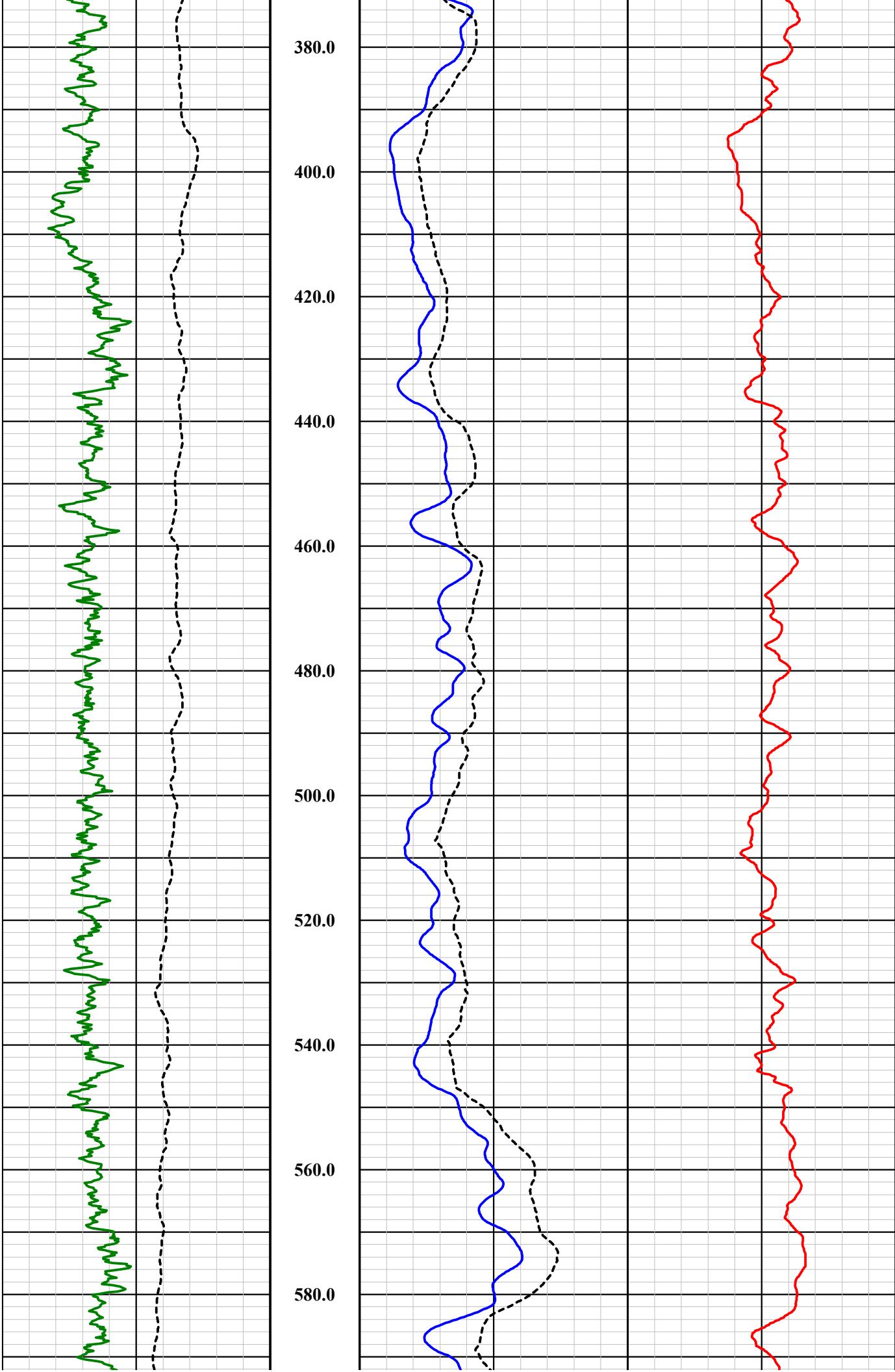
-400 mV 600

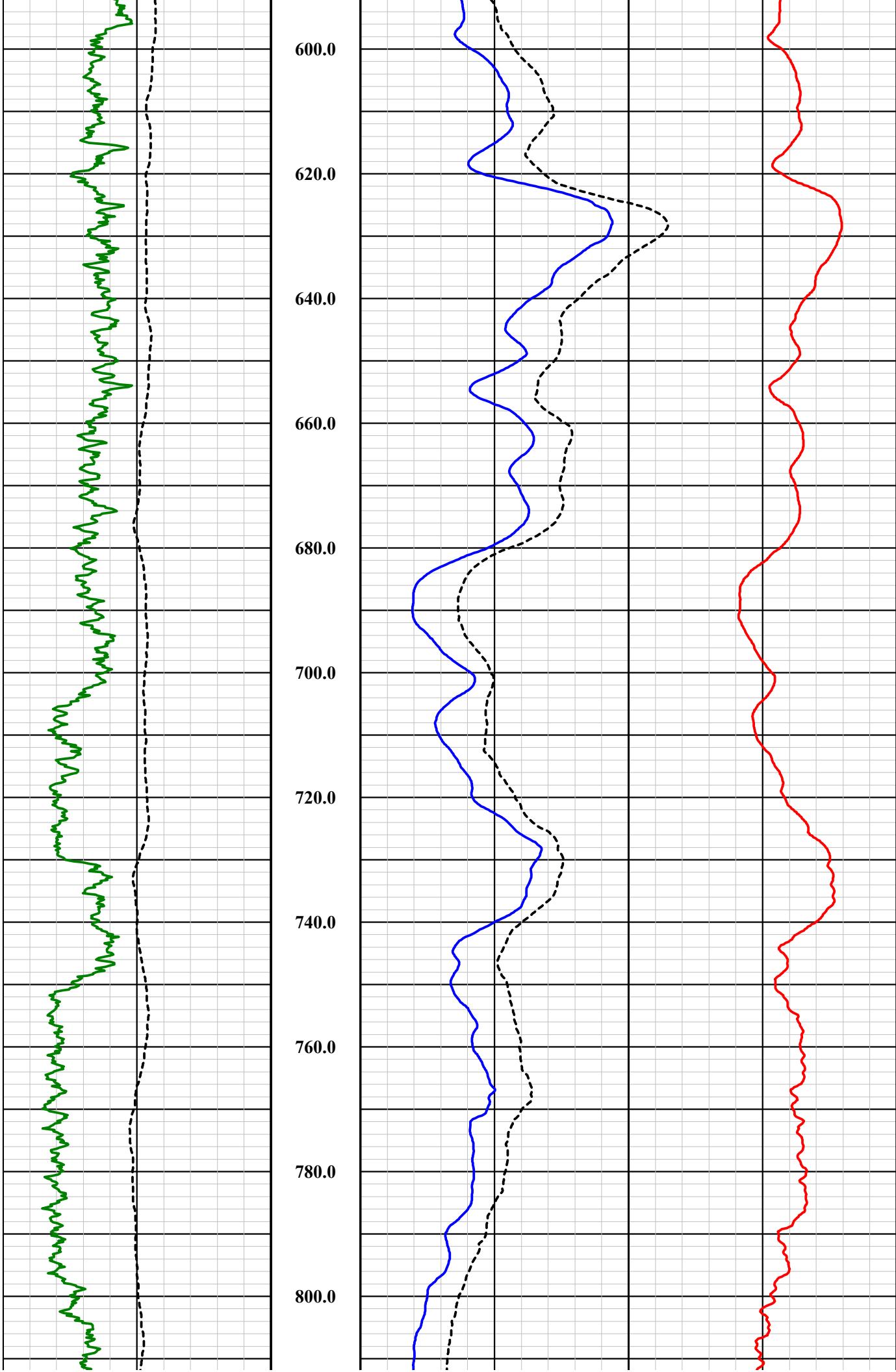
64" NRes
0 Ohm-m 400

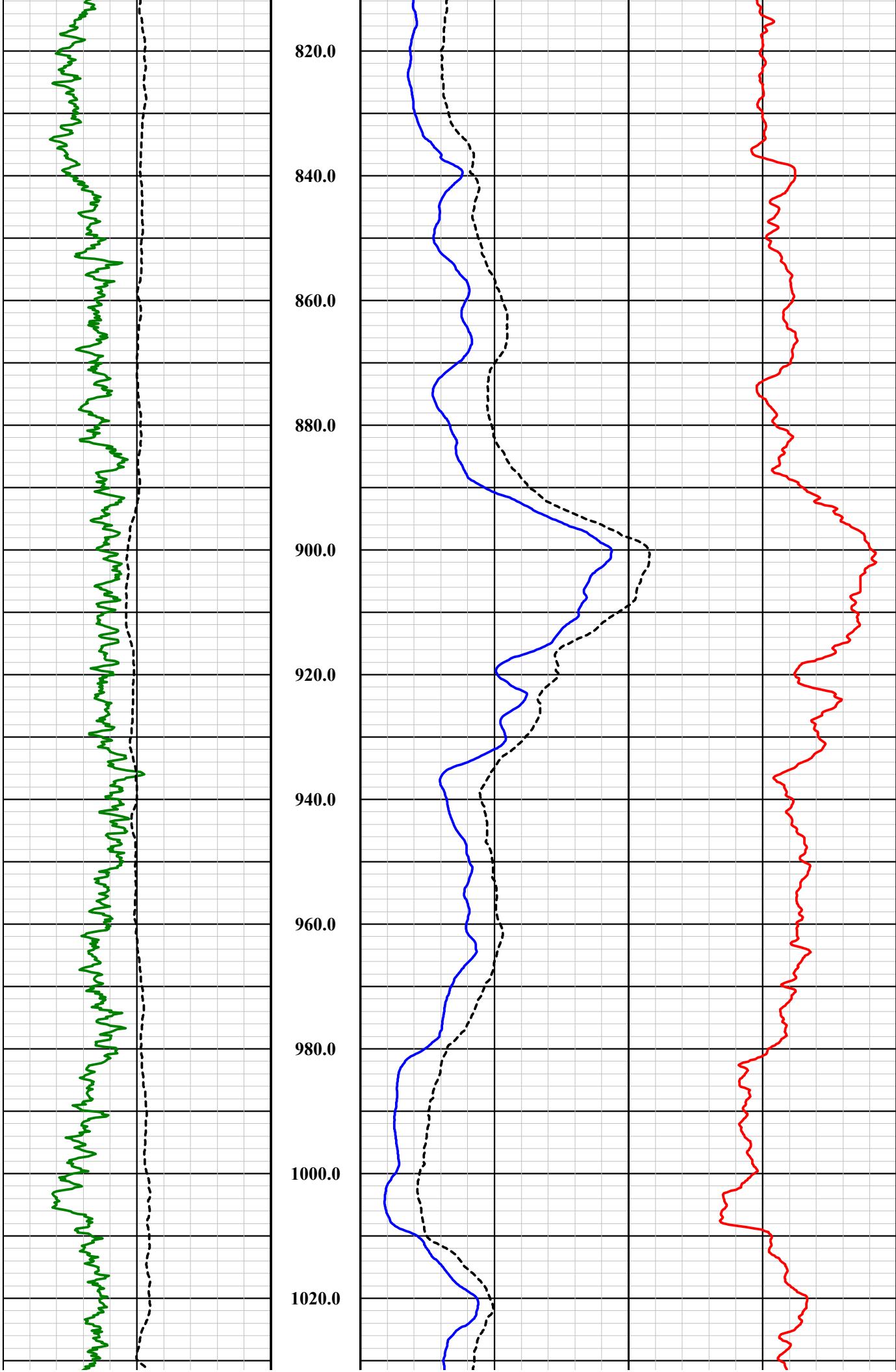
SPR
0 Ohms 50

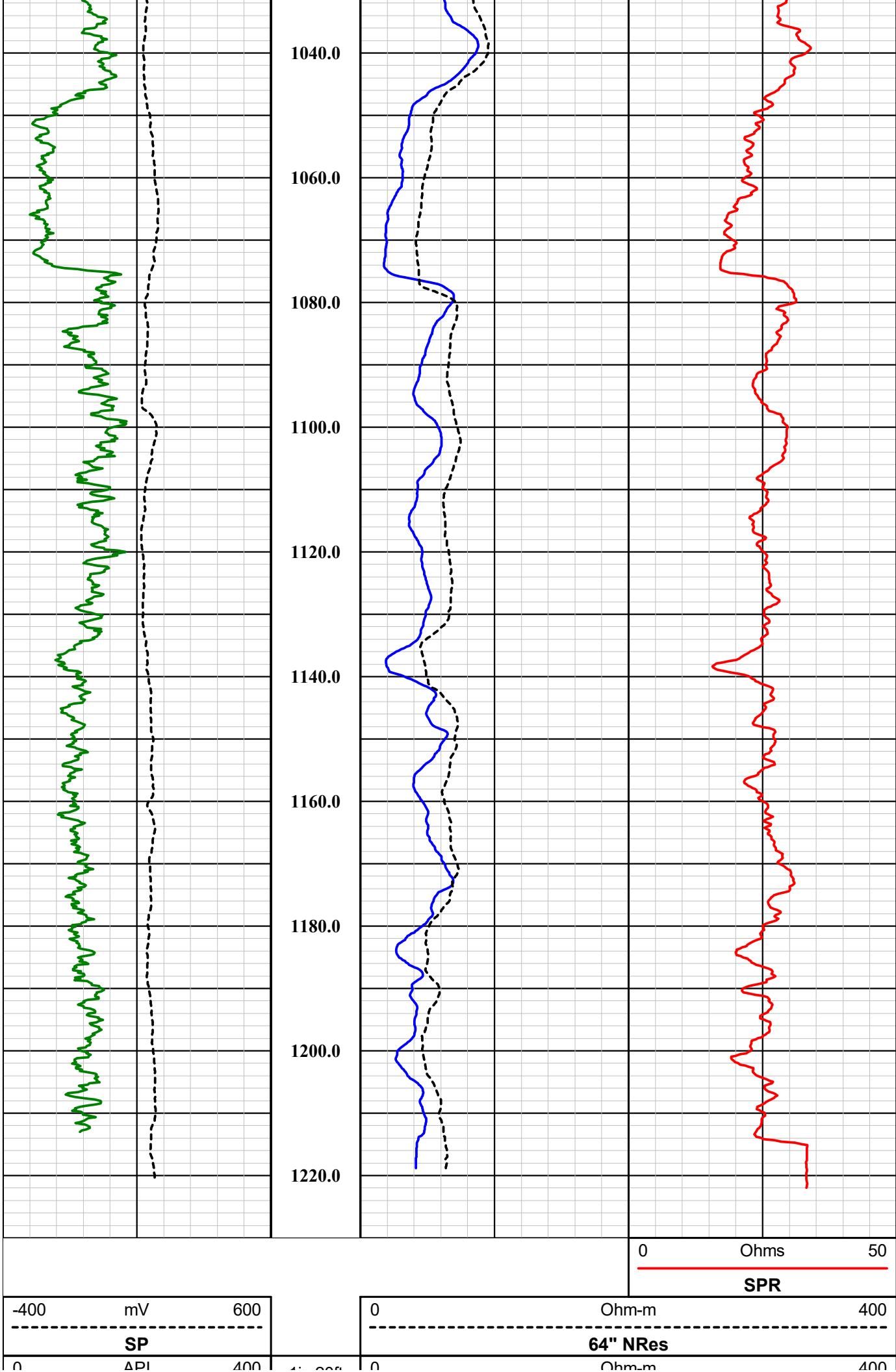












-400 mV 600  
-----  
SP

0 Ohm-m 400  
-----  
64" NRes

0 Ohm-m 400  
-----  
SPR

0	API	400	11h:20ft	0	CHINCH	400
Nat. Gamma	Depth				16" NRes	

# GeoVista E-Log Tool

Probe Top = Depth Ref.

Tool SN: 4035 & 4790



Bridle connects to wireline cablehead: Wireline armor is the B Electrode.

Four Conductor Probe Top

Bridle Electrode (N Electrode)

64" Normal Resistivity Electrode/Spontaneous Potential Electrode (M Electrode)

Probe Length = 2.3 m or 7.55 ft

Bridle Length = 10.0 m or 32.81 ft

Probe Weight = 7.0 kg or 15.4 lbs

Can only be collected in fluid

Isolation Bridle - Not shown in diagram but is necessary for operation

Electrode Measuring Points (from bottom of probe)

Spontaneous Potential (SP): 0.65 m or 2.13 ft

16" Normal Resistivity (16" NRes): 0.50 m or 1.64 ft

64" Normal Resistivity (64" NRes): 1.10 m or 3.61 ft

Single Point Resistance (SPR): 0.25 m or 0.82 ft

Temperature Rating: 80 Deg C (176 Deg F)

Pressure Rating: 200 bar (2900 psi)

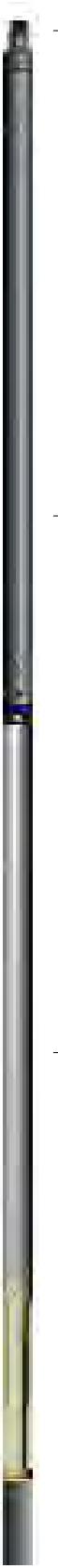
16" Normal Resistivity Electrode (M Electrode)

Current Electrode/Single Point Resistance (A Electrode)

 1.65" or 42 mm Diameter

## MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

\*NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized\*

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter



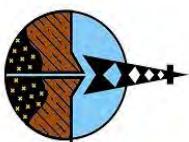
**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	WB-04
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

**E-Log Summary**



# Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	WB-04		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
<b>TYPE OF LOGS: GAMMA - CALIPER</b>			
<b>MORE: TEMP. / FLUID RES.</b>			
LOCATION	OTHER SERVICES E-LOG SONIC DEVIATION		
SEC	TWP	RGE	ELEVATION
PERMANENT DATUM	GROUND LEVEL	ABOVE PERM. DATUM	K.B. D.F. G.L.
DATE	2-22-18	TYPE FLUID IN HOLE	MUD
RUN No	1	MUD WEIGHT	N/A
TYPE LOG	GAMMA - CALIPER - TFR	VISCOSITY	N/A
DEPTH-DRILLER	1220 FT.	LEVEL	FULL
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	27.57 DEG. C
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.2 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	11:00 A.M.

## Tool Summary:

Date	2-22-18	Date	2-22-18	Date	2-22-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60mm SONIC
Tool SN	5543	Tool SN	4035	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900	Truck No	900	Truck No	900
Operation Check	2-21-18	Operation Check	2-21-18	Operation Check	2-21-18
Calibration Check	2-21-18	Calibration Check	2-21-18	Calibration Check	N/A
Time Logged	11:15 A.M.	Time Logged	12:05 P.M.	Time Logged	12:45 P.M.

Date	2-22-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	6002	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	2-21-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	1:45 P.M.	Time Logged		Time Logged	

## Additional Comments:

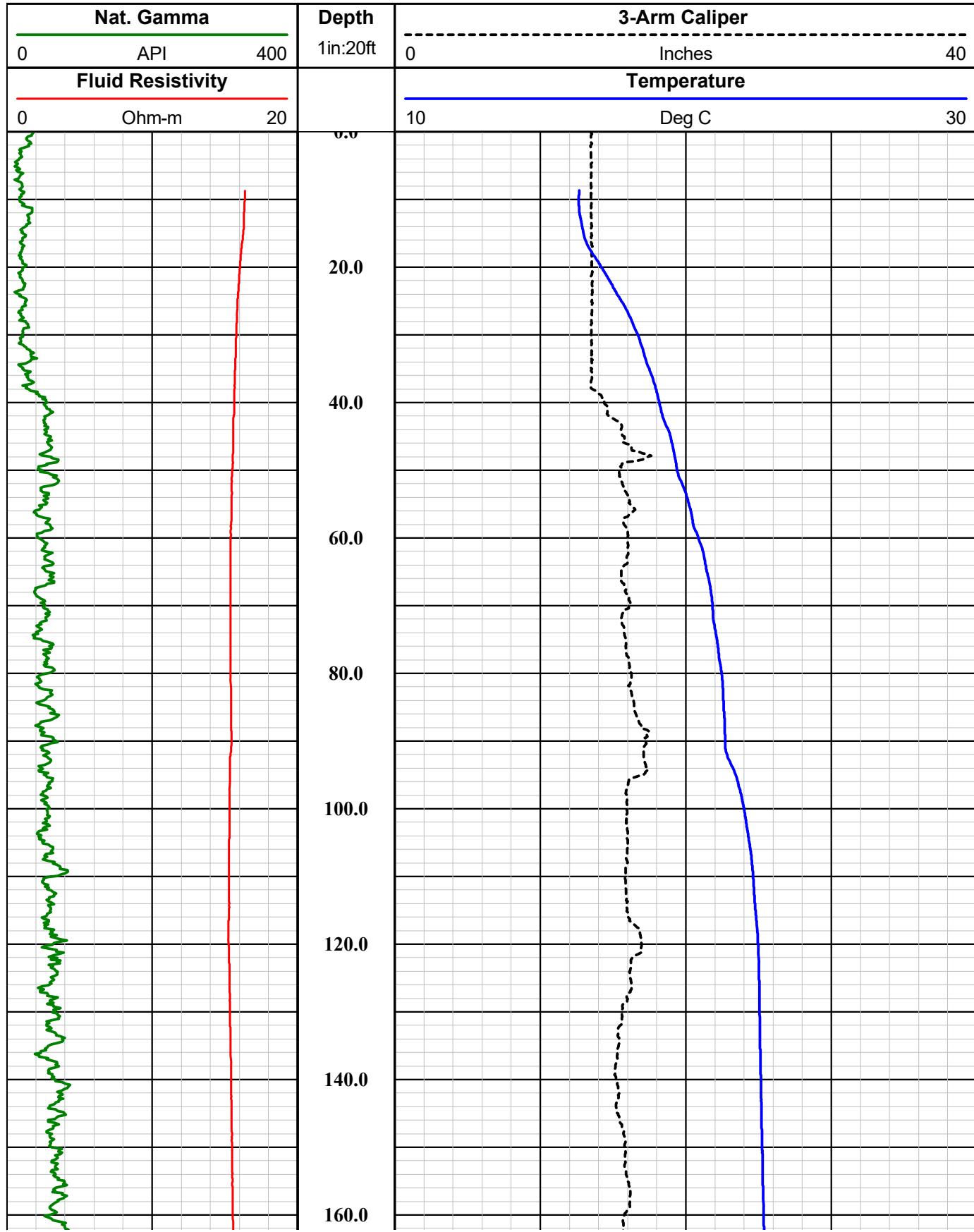
Caliper Arms Used: 15 IN.

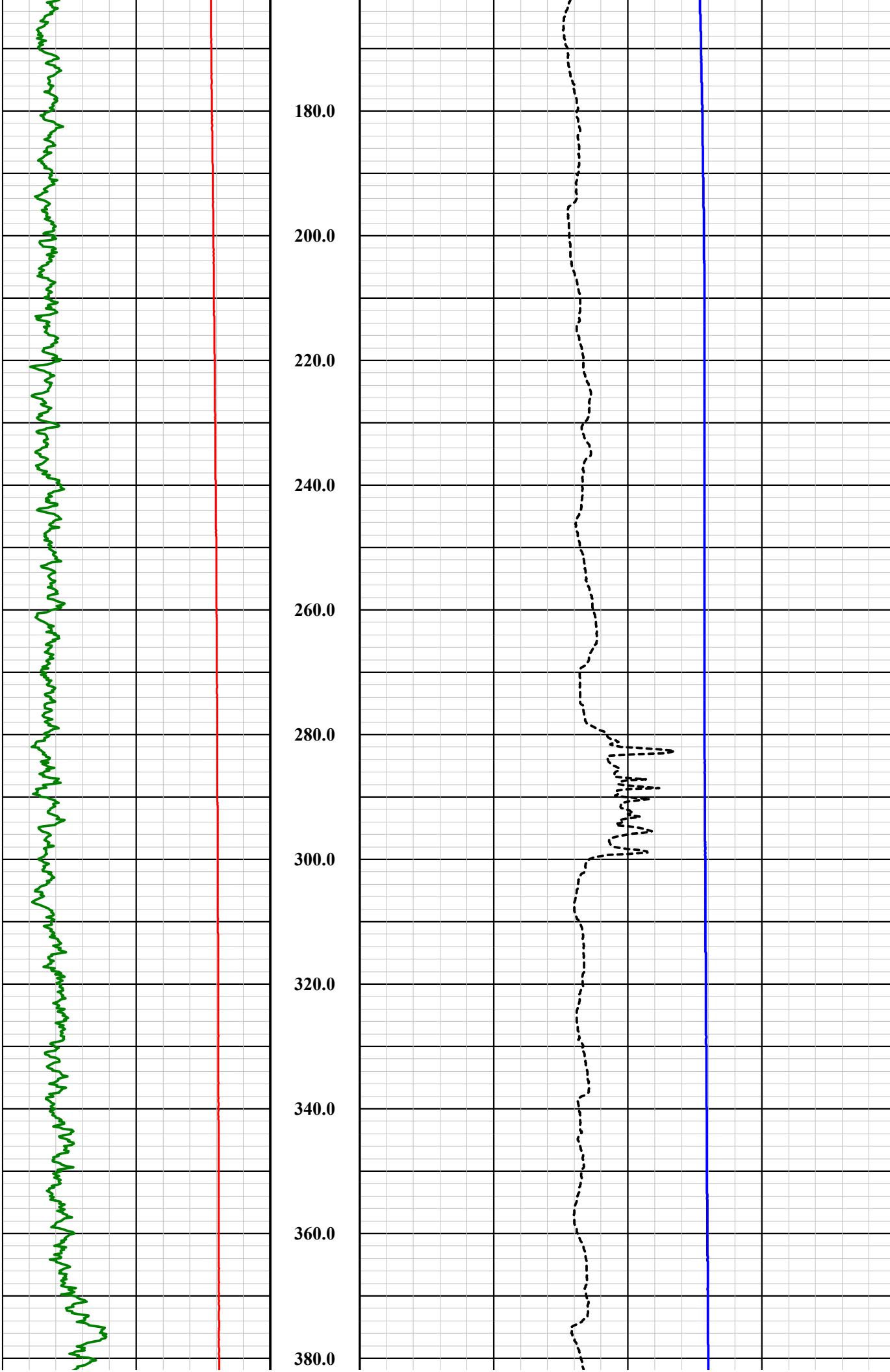
Calibration Points: 8 IN. & 23 IN.

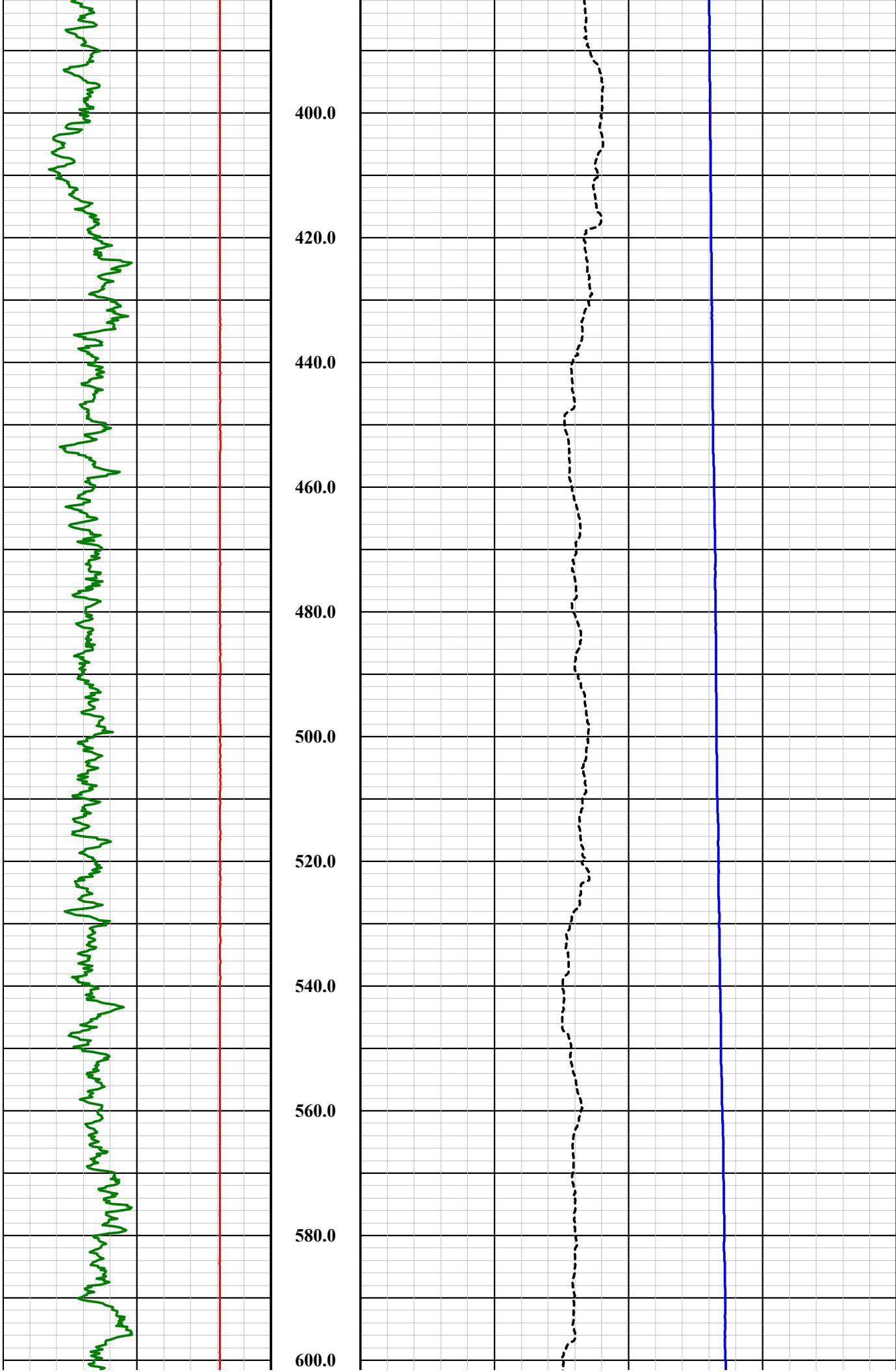
Comments: .

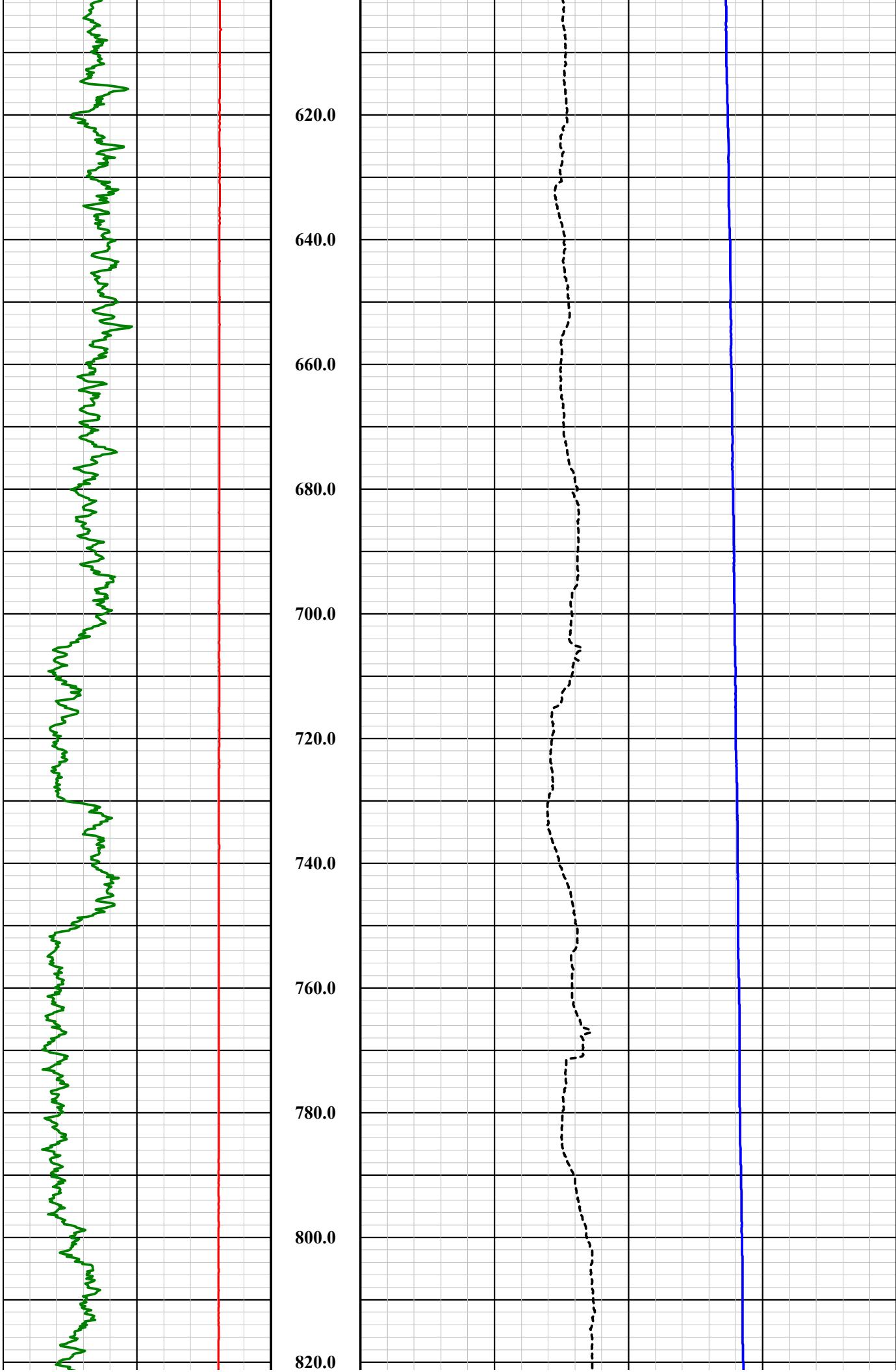
**Disclaimer:**

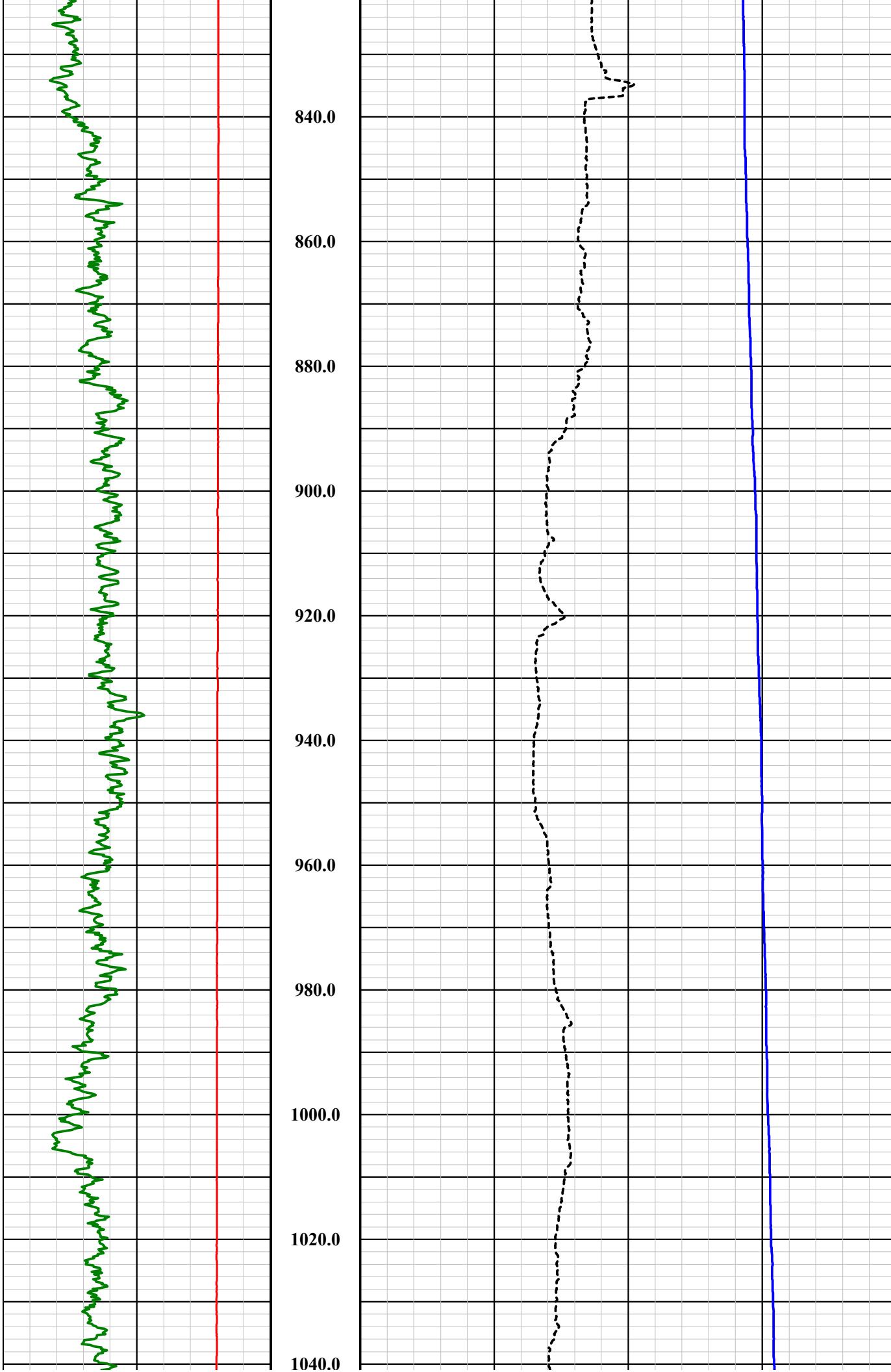
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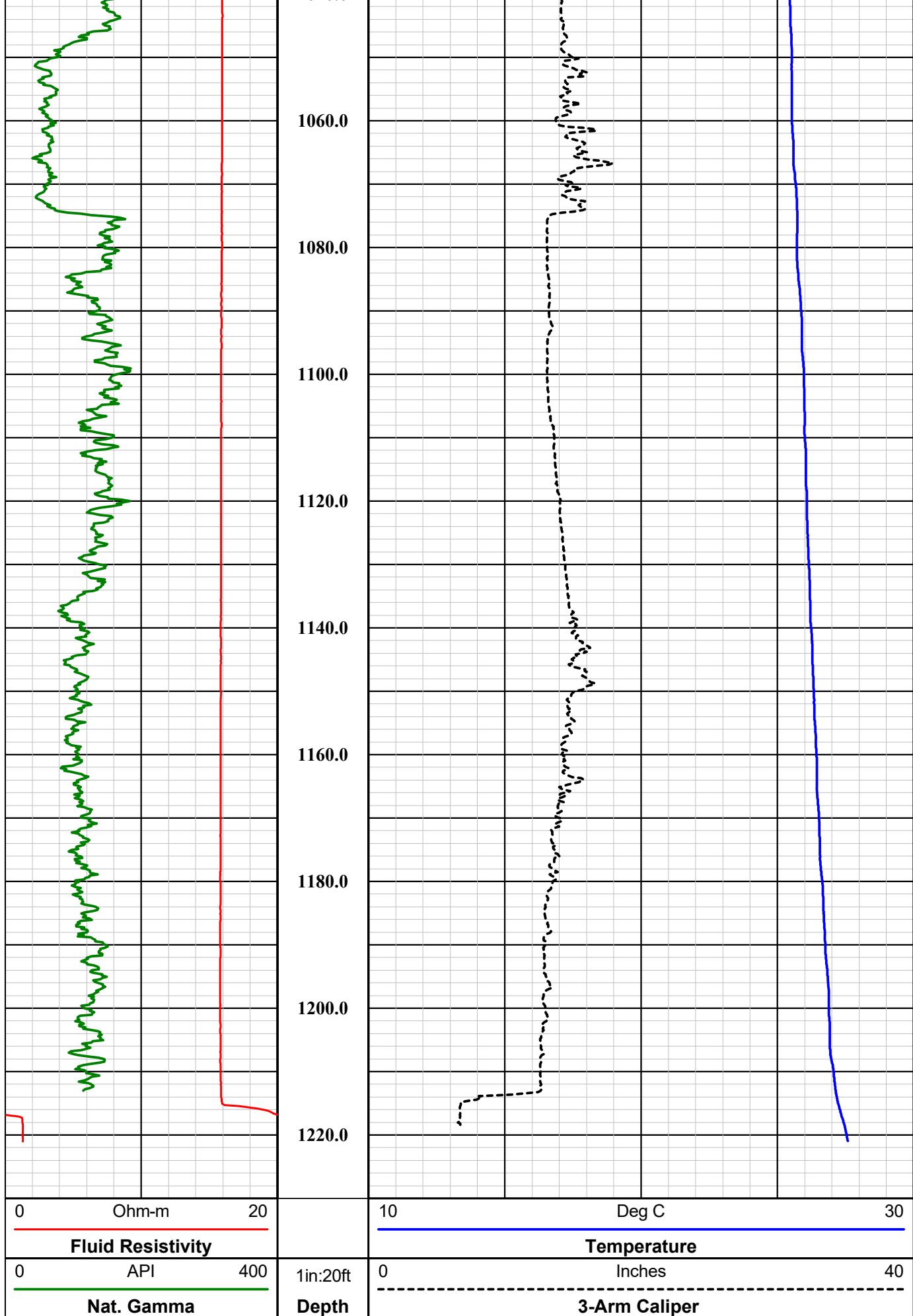








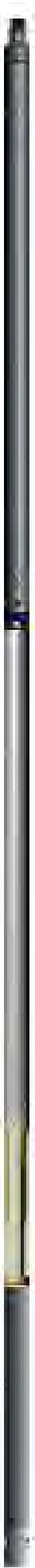




MSI Gamma-Caliper-Temperature-Fluid Resistivity

# MSI Gamma Caliper Temperature/Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

\*NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized\*

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)



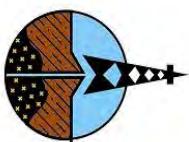
**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	WB-04
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

Final

## GCT Summary



# Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	WB-04		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
<b>TYPE OF LOGS:</b> 60mm SONIC			OTHER SERVICES E-LOG TEMPERATURE FLUID RESISTIVITY DEVIATION
<b>MORE:</b> <b>GAMMA - CALIPER</b>			
LOCATION	SEC	TWP	RGE
PERMANENT DATUM	ELEVATION		
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	
DRILLING MEAS. FROM	GROUND LEVEL		
DATE	2-22-18	TYPE FLUID IN HOLE	K.B.
RUN No	1 & 3	MUD WEIGHT	D.F.
TYPE LOG	SONIC - GAMMA - CALIPER	VISCOSITY	G.L.
DEPTH-DRILLER	1220 FT.	LEVEL	
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	MUD
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	N/A
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	0.25 FT.
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	TRUCK #900
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI 60mm SONIC SN 5050
WITNESSED BY	SCOTT - H&A	LOG TIME:ON SITE/OFF SITE	11:00 A.M.
BOREHOLE RECORD			
RUN	BOREHOLE RECORD	CASING RECORD	
NO.	BIT	FROM	TO
1	?	SURFACE	40 FT.
2	12 1/4 IN.	40 FT.	TOTAL DEPTH
3			
COMMENTS:			

Tool Summary:					
Date	2-22-18	Date	2-22-18	Date	2-22-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60mm SONIC
Tool SN	5543	Tool SN	4035	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900	Truck No	900	Truck No	900
Operation Check	2-21-18	Operation Check	2-21-18	Operation Check	2-21-18
Calibration Check	2-21-18	Calibration Check	2-21-18	Calibration Check	N/A
Time Logged	11:15 A.M.	Time Logged	12:05 P.M.	Time Logged	12:45 P.M.

Tool Summary:					
Date	2-22-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	6002	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	2-21-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	1:45 P.M.	Time Logged		Time Logged	

Additional Comments:  
Caliper Arms Used: 15 IN.

Calibration Points: 8 IN. & 23 IN.

E-Log Calibration Range: 10-1000 OHM-M

Calibration Points: 10 &amp; 1000 OHM-M

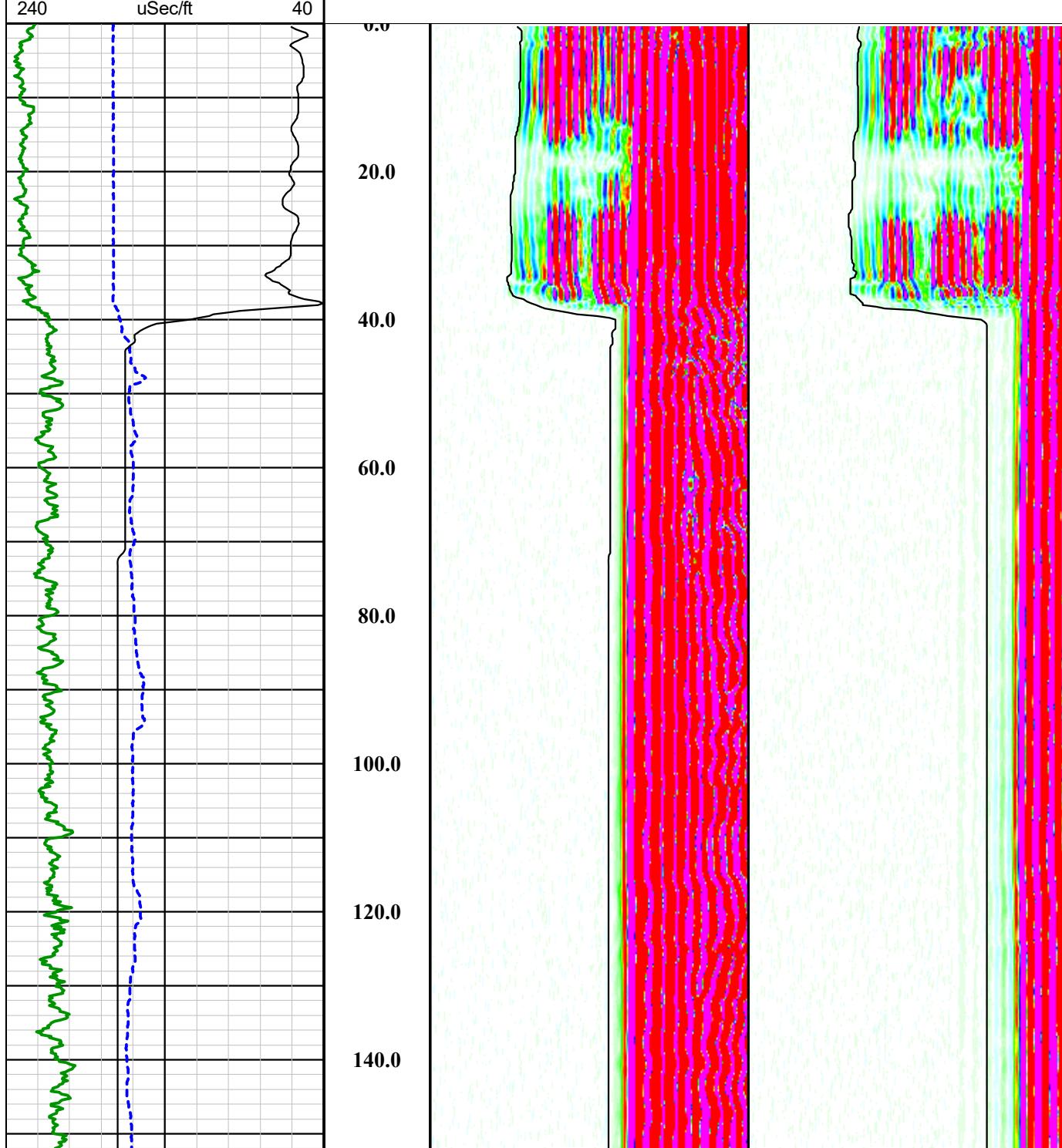
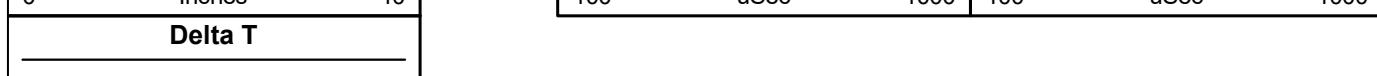
**Disclaimer:**

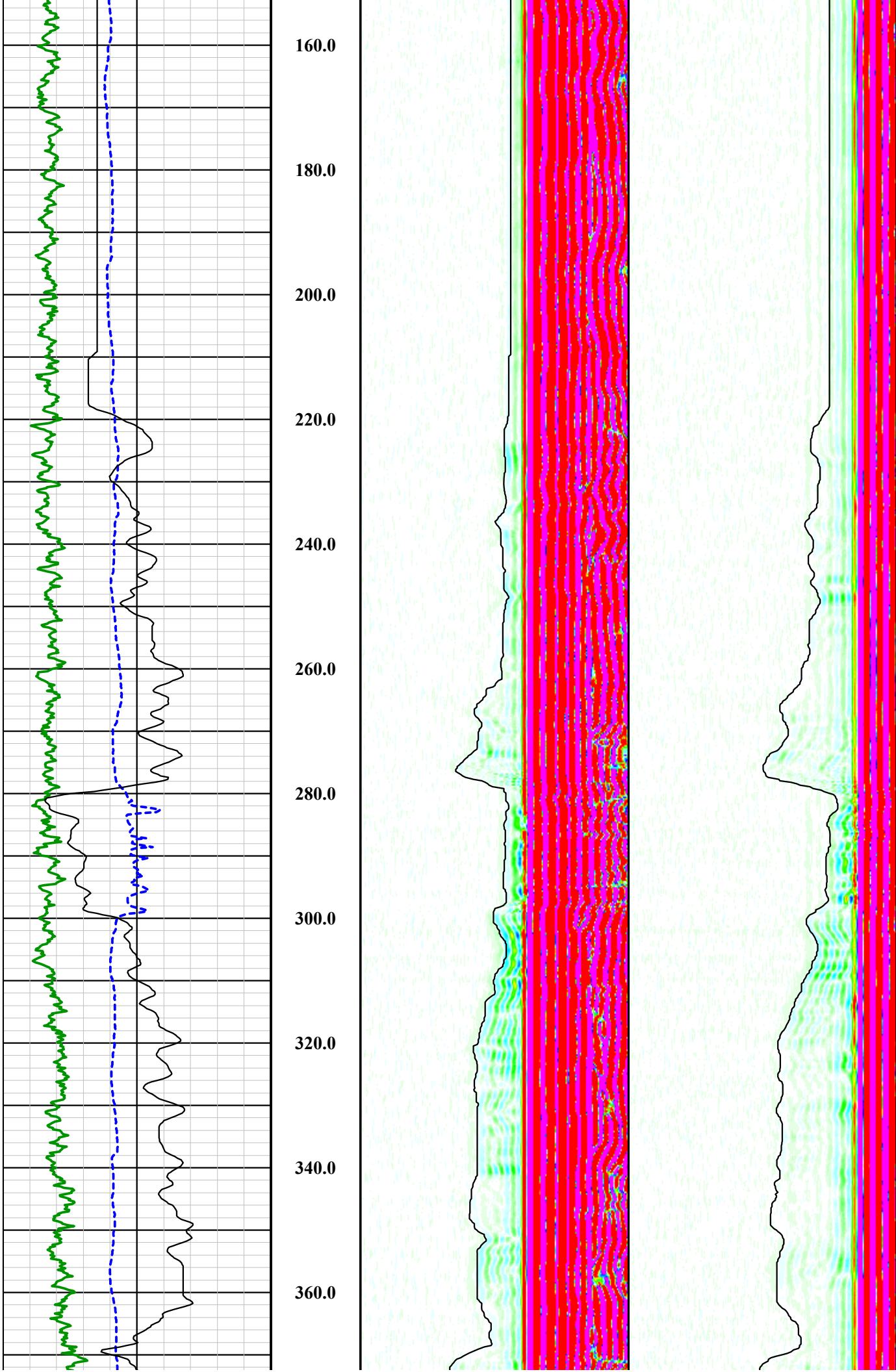
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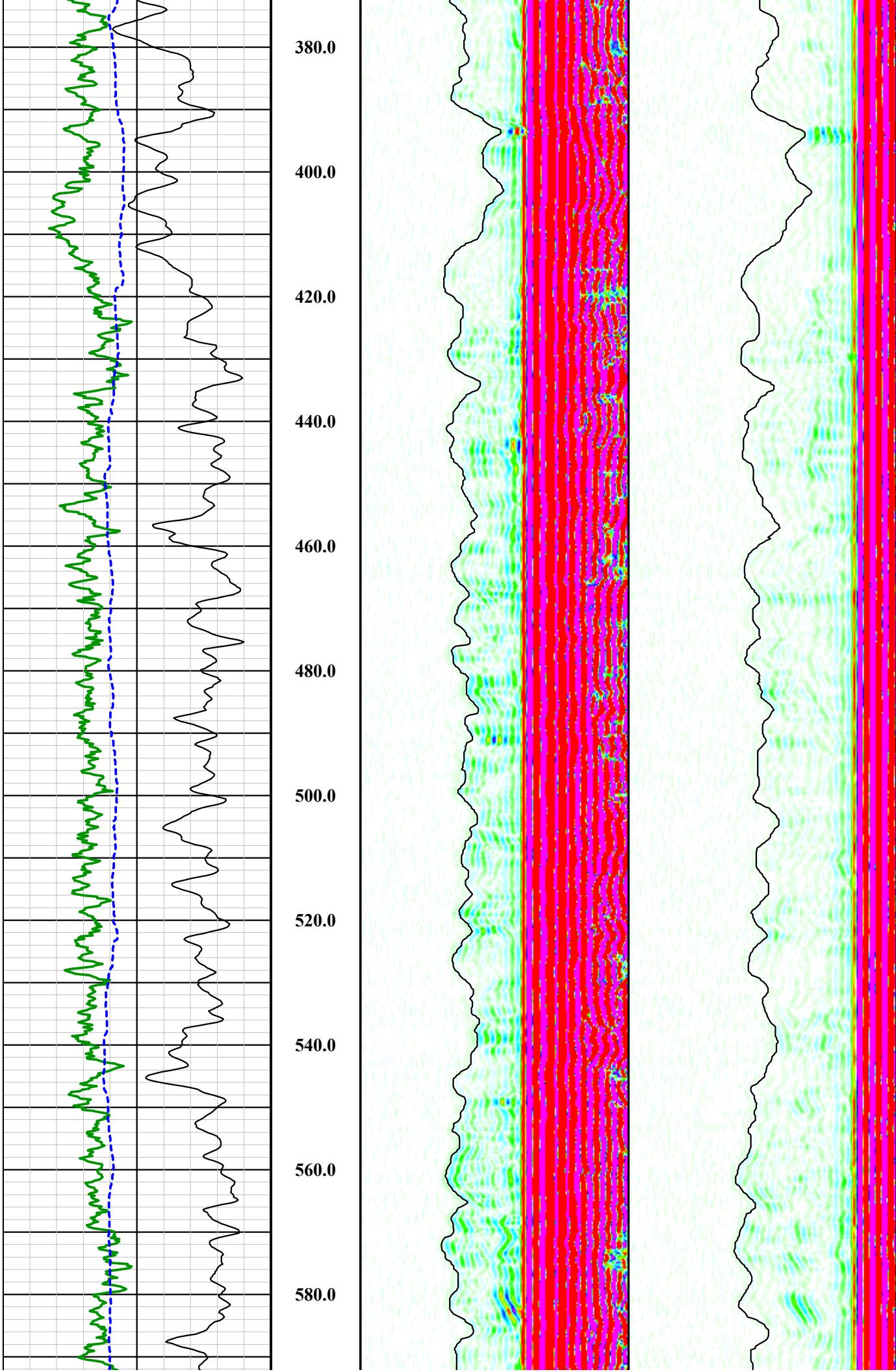
Nat. Gamma	Depth	RX1 - VDL	RX2 - VDL
0 API 400	1in:20ft	100 uSec 1000	100 uSec 1000

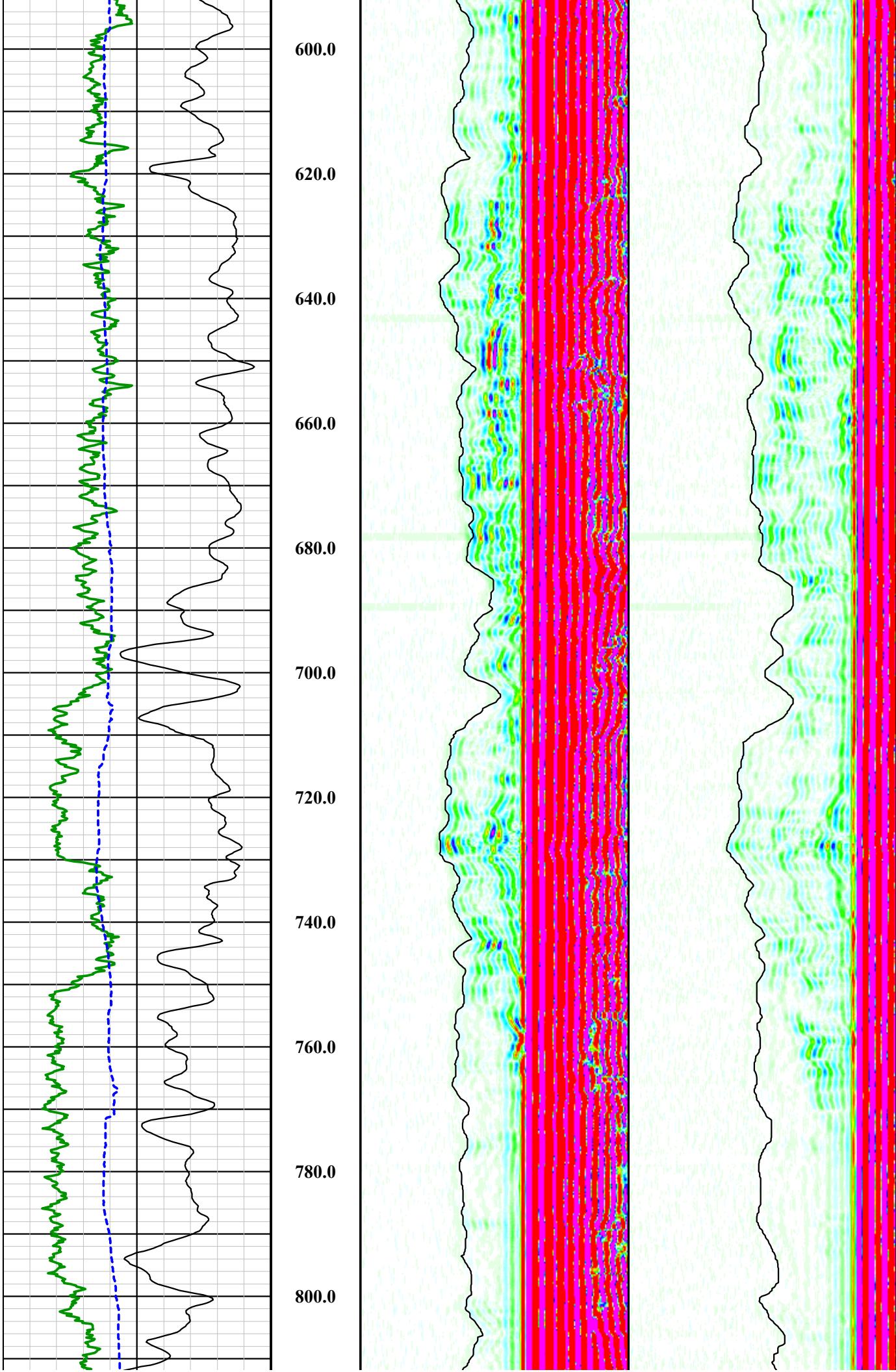
3-Arm Caliper	RX1 - Travel Time	RX2 - Travel Time
0 Inches 40	100 uSec 1000	100 uSec 1000

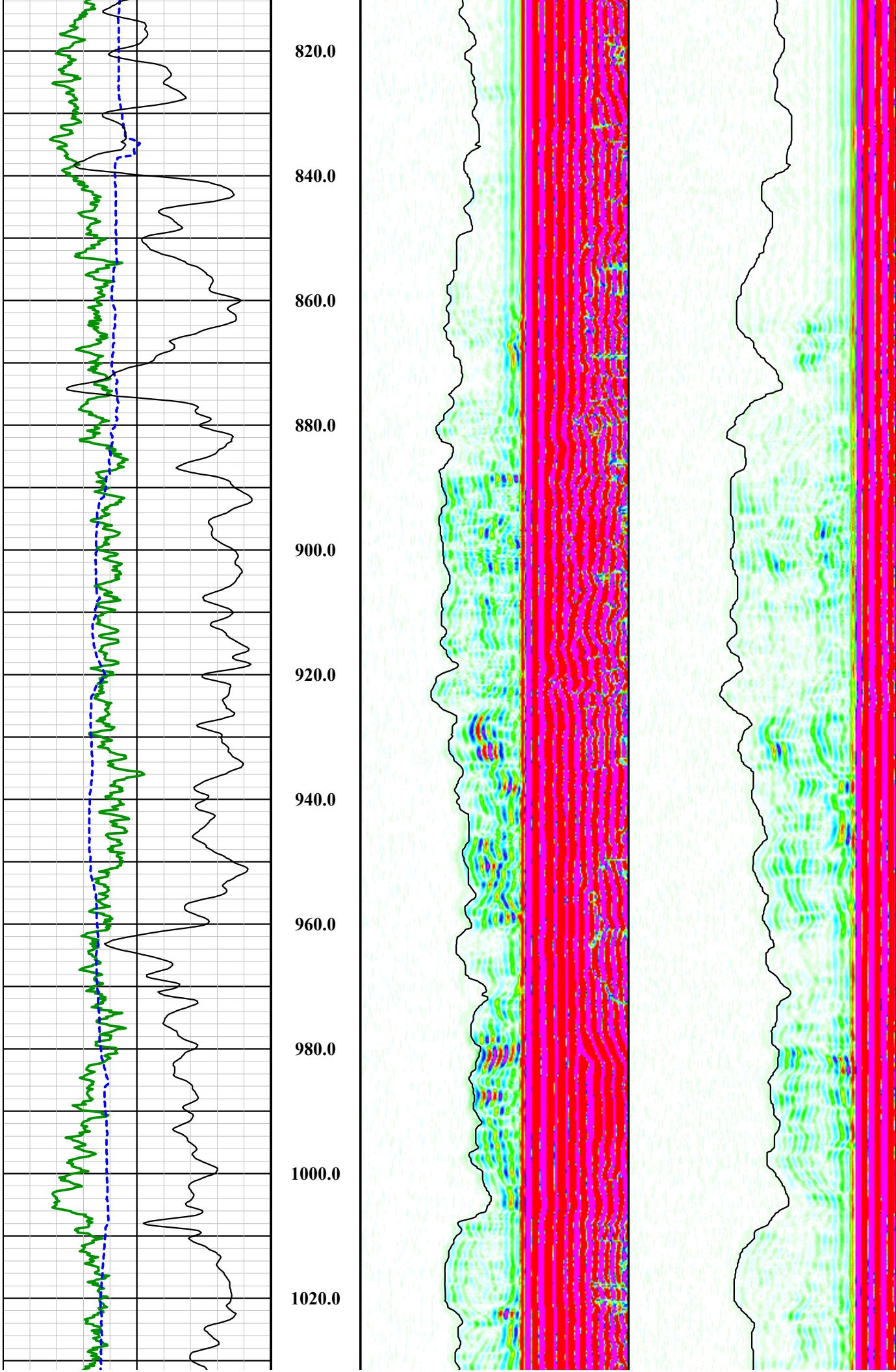
Delta T	RX1 - Travel Time	RX2 - Travel Time
240 uSec/ft 40	100 uSec 1000	100 uSec 1000

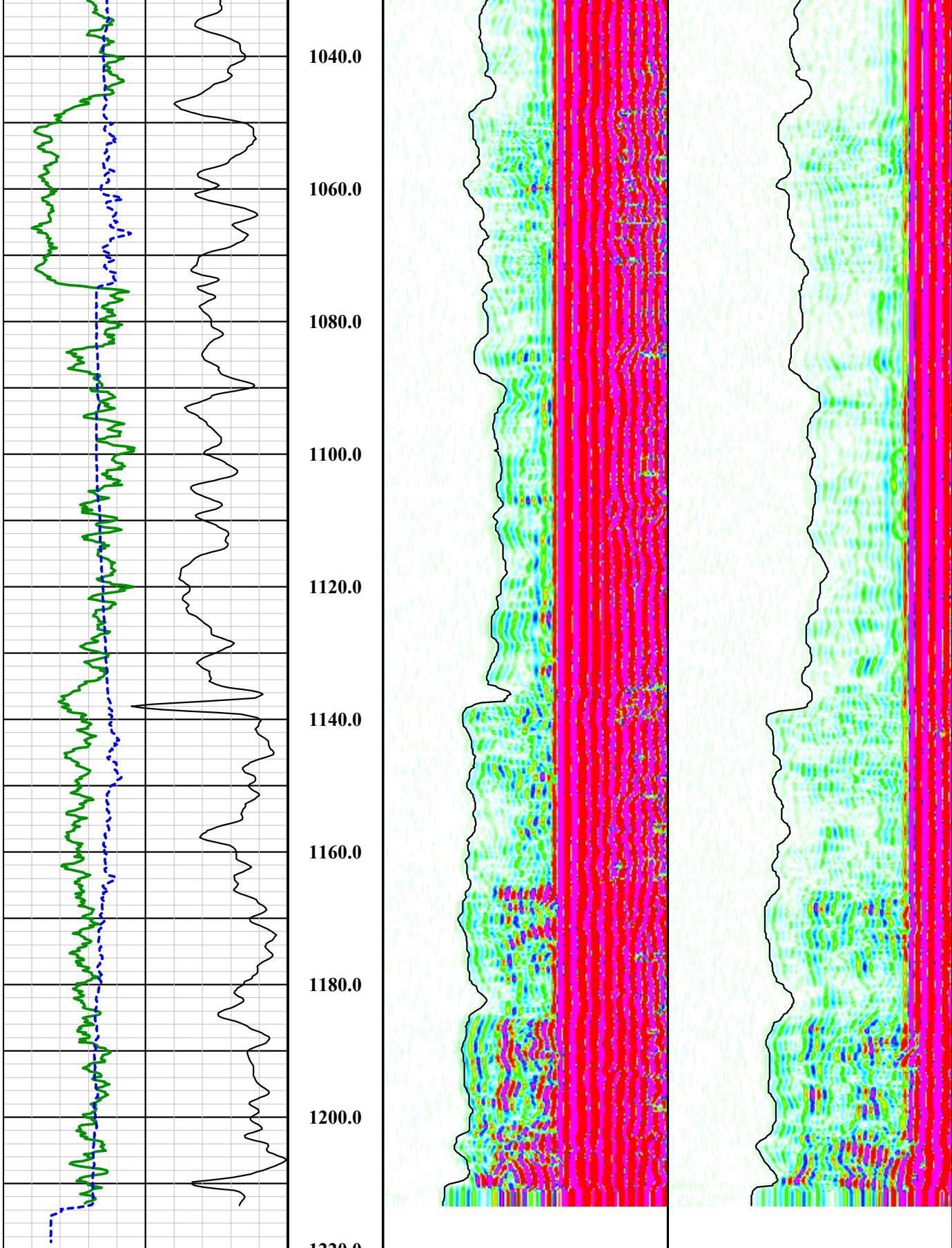












240      uSec/ft      40

**Delta T**

0      Inches      40

**3-Arm Caliper**

0      API      400

**Nat. Gamma**

1040.0

1060.0

1080.0

1100.0

1120.0

1140.0

1160.0

1180.0

1200.0

1220.0

100      uSec      1000

**RX1 - Travel Time**

100      uSec      1000

**RX2 - Travel Time**

Depth

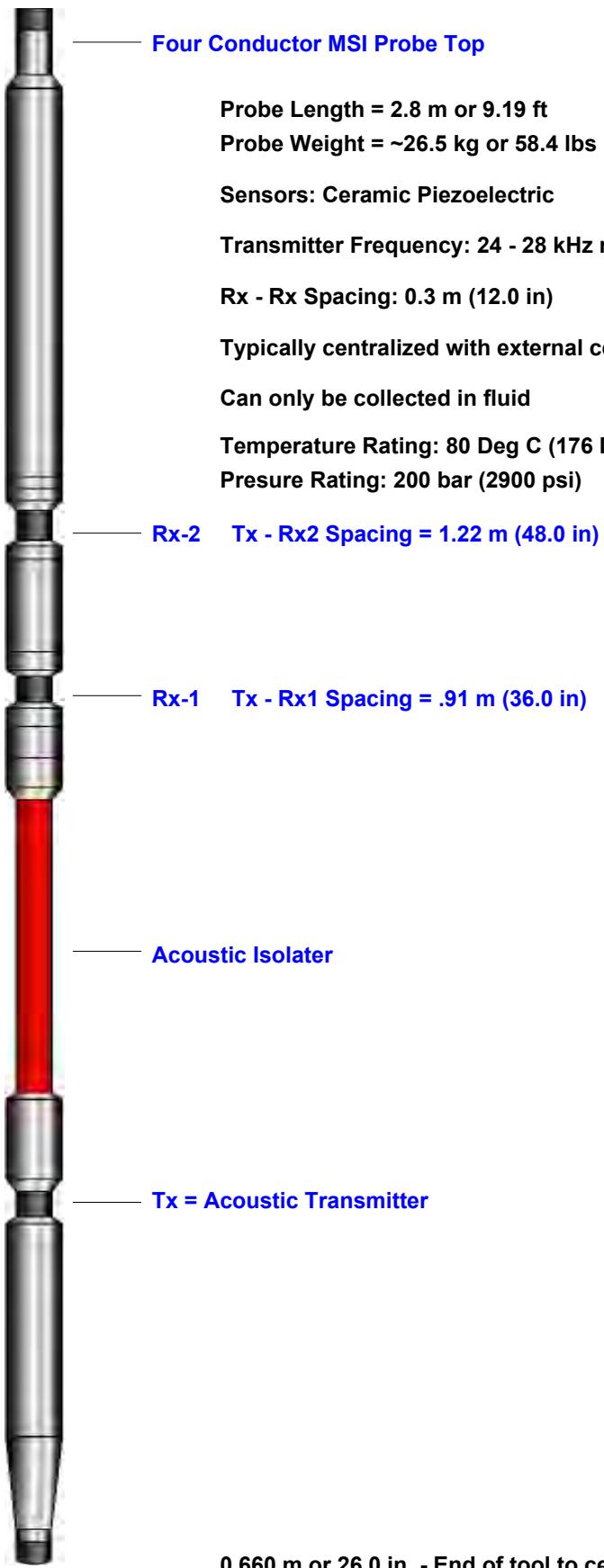
**RX1 - VDL**

**RX2 - VDL**

# MSI 60 mm 2 RX Full Waveform Sonic Tool

Probe Top = Depth Ref.

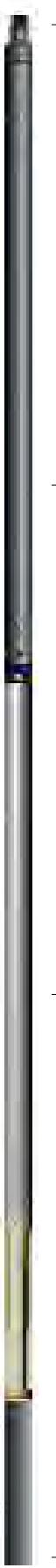
Tool SN: 5001, 5050 & 6003



0.660 m or 26.0 in. - End of tool to center of Tx

## MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



Single Conductor MSI Probe Top

Probe Length = 2.59 m or 8.5 ft

Probe Weight = 6.80 kg or 15.0 lbs

Natural Gamma and Caliper can only be collected logging up hole.

Fluid Temperature/Resistivity can only be collected logging down hole.

Temperature Rating: 70 Deg C (158 Deg F)

Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

\*NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized\*

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

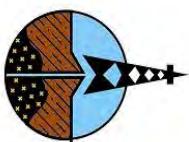


**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Company	FLORENCE COPPER
Well	WB-04
Field	FLORENCE COPPER
County	PINAL
State	ARIZONA

## Final                    Sonic Summary



# Southwest Exploration Services, LLC

borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	WB-04		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
<b>TYPE OF LOGS: CALIPER MORE: W / VOLUME CALC.</b>			
LOG MEAS. FROM	GROUND LEVEL	ABOVE PERM. DATUM	ELEVATION
DRILLING MEAS. FROM	GROUND LEVEL		
DATE	2-22-18	TYPE FLUID IN HOLE	K.B.
RUN No	1	MUD WEIGHT	D.F.
TYPE LOG	CALIPER W/ VOLUME CALC	VISCOSITY	G.L.
DEPTH-DRILLER	1220 FT.	LEVEL	
DEPTH-LOGGER	1220 FT.	MAX. REC. TEMP.	
BTM LOGGED INTERVAL	1220 FT.	IMAGE ORIENTED TO:	
TOP LOGGED INTERVAL	SURFACE	SAMPLE INTERVAL	
DRILLER / RIG#	HYDRO RESOURCES	LOGGING TRUCK	
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES	TOOL STRING/SN	MSI COMBO TOOL SN 5543
WITNESSED BY	SCOTT - H&A	LOG TIME: ON SITE/OFF SITE	11:00 A.M.
<b>PERMANENT DATUM</b>			
DATE	2-22-18	Date	2-22-18
LOG MEAS. FROM	GROUND LEVEL	OTHER SERVICES	
DRILLING MEAS. FROM	GROUND LEVEL	E-LOG	
DATE	2-22-18	SONIC	
RUN No	1	DEVIATION	
TYPE LOG	CALIPER W/ VOLUME CALC	NAT. GAMMA	
DEPTH-DRILLER	1220 FT.	TEMPERATURE	
DEPTH-LOGGER	1220 FT.	FLUID RESISTIVITY	

Tool Summary:					
Date	2-22-18	Date	2-22-18	Date	2-22-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	GEOVISTA E-LOG	Tool Model	MSI 60mm SONIC
Tool SN	5543	Tool SN	4035	Tool SN	5050
From	SURFACE	From	SURFACE	From	SURFACE
To	1220 FT.	To	1220 FT.	To	1220 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900	Truck No	900	Truck No	900
Operation Check	2-21-18	Operation Check	2-21-18	Operation Check	2-21-18
Calibration Check	2-21-18	Calibration Check	2-21-18	Calibration Check	N/A
Time Logged	11:15 A.M.	Time Logged	12:05 P.M.	Time Logged	12:45 P.M.

Date	2-22-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	MSI DEVIATION	Tool Model		Tool Model	
Tool SN	6002	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1220 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	2-21-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	1:45 P.M.	Time Logged		Time Logged	

## Additional Comments:

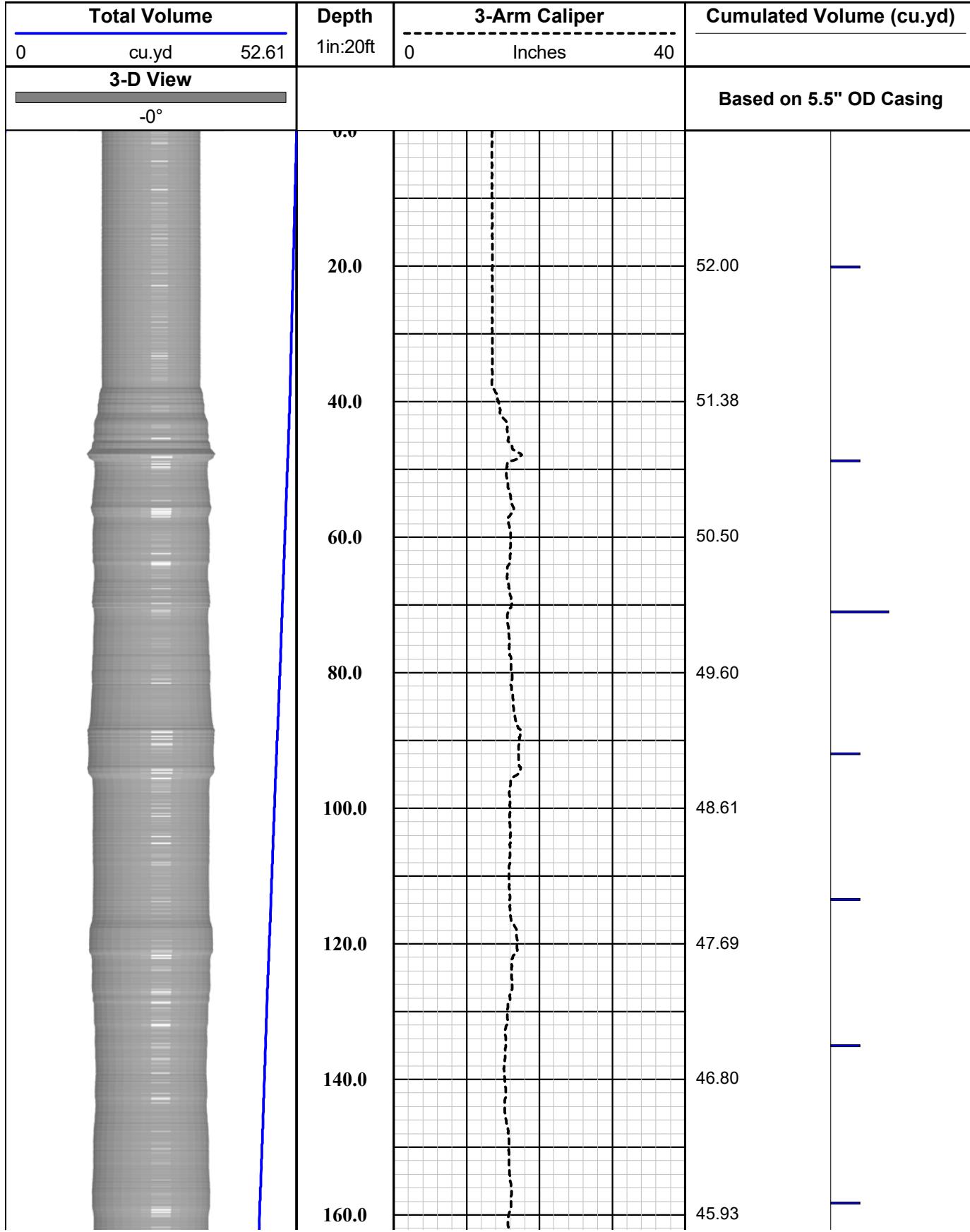
Caliper Arms Used: 15 IN.

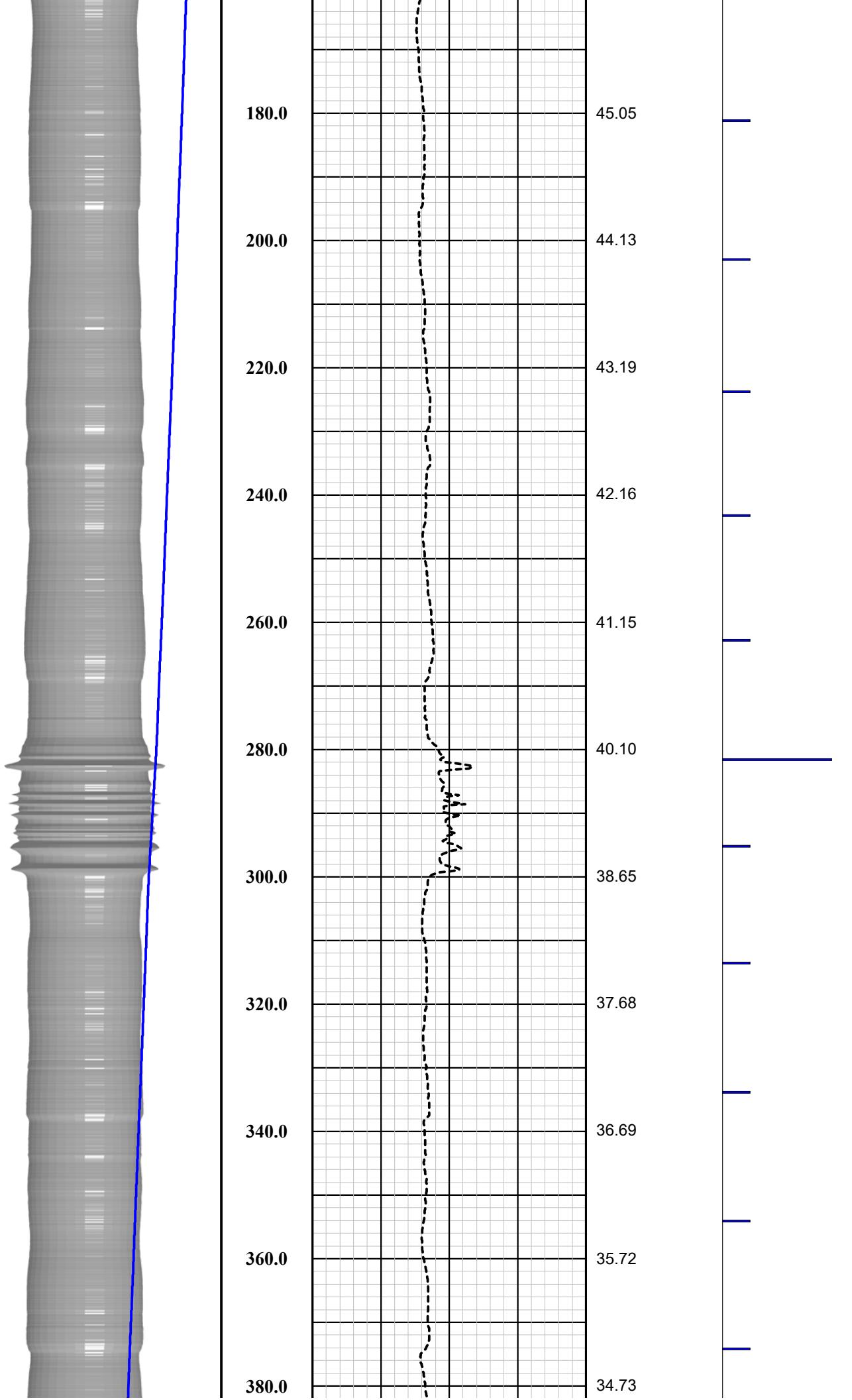
Calibration Points: 8 IN. & 23 IN.

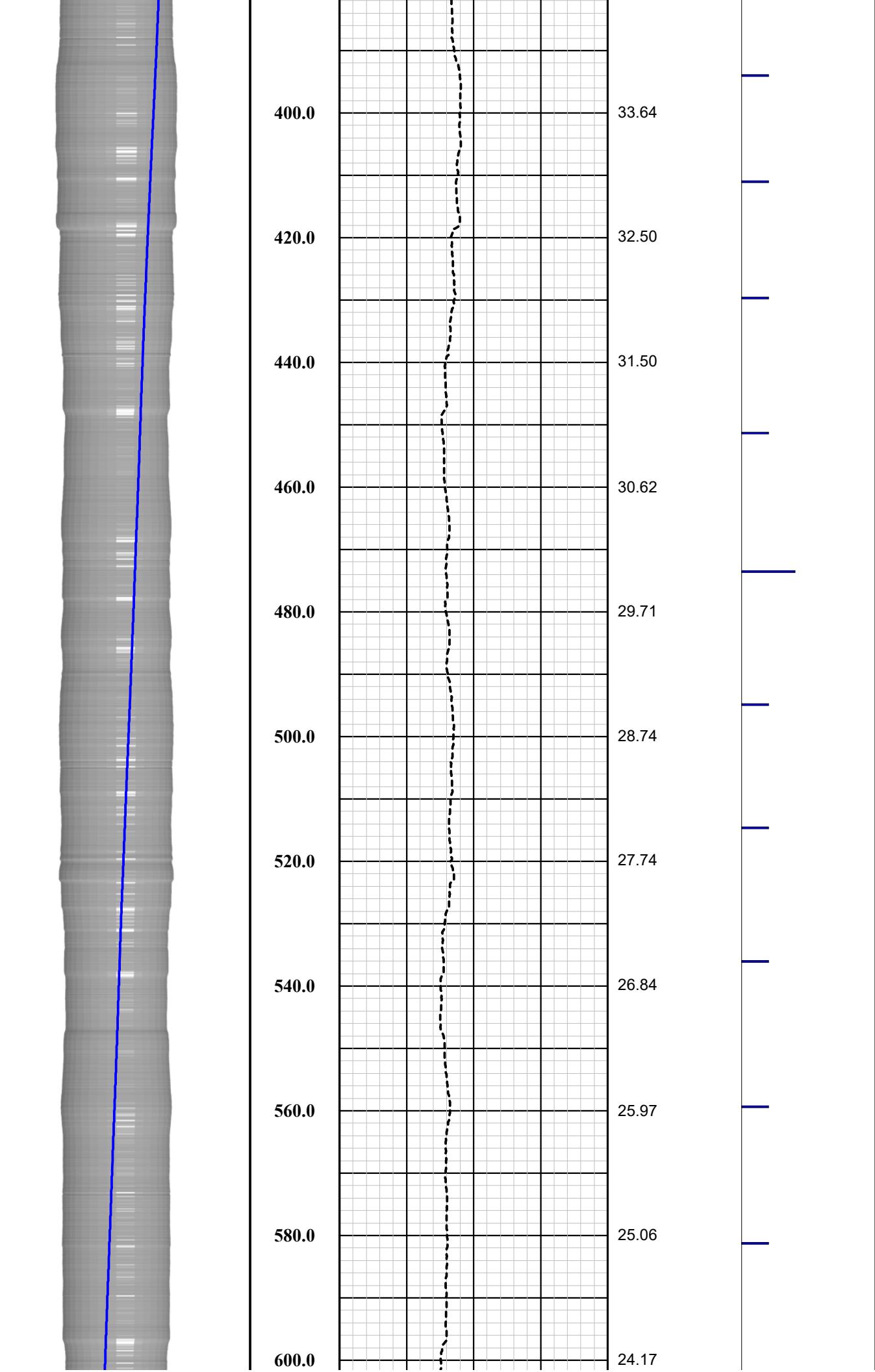
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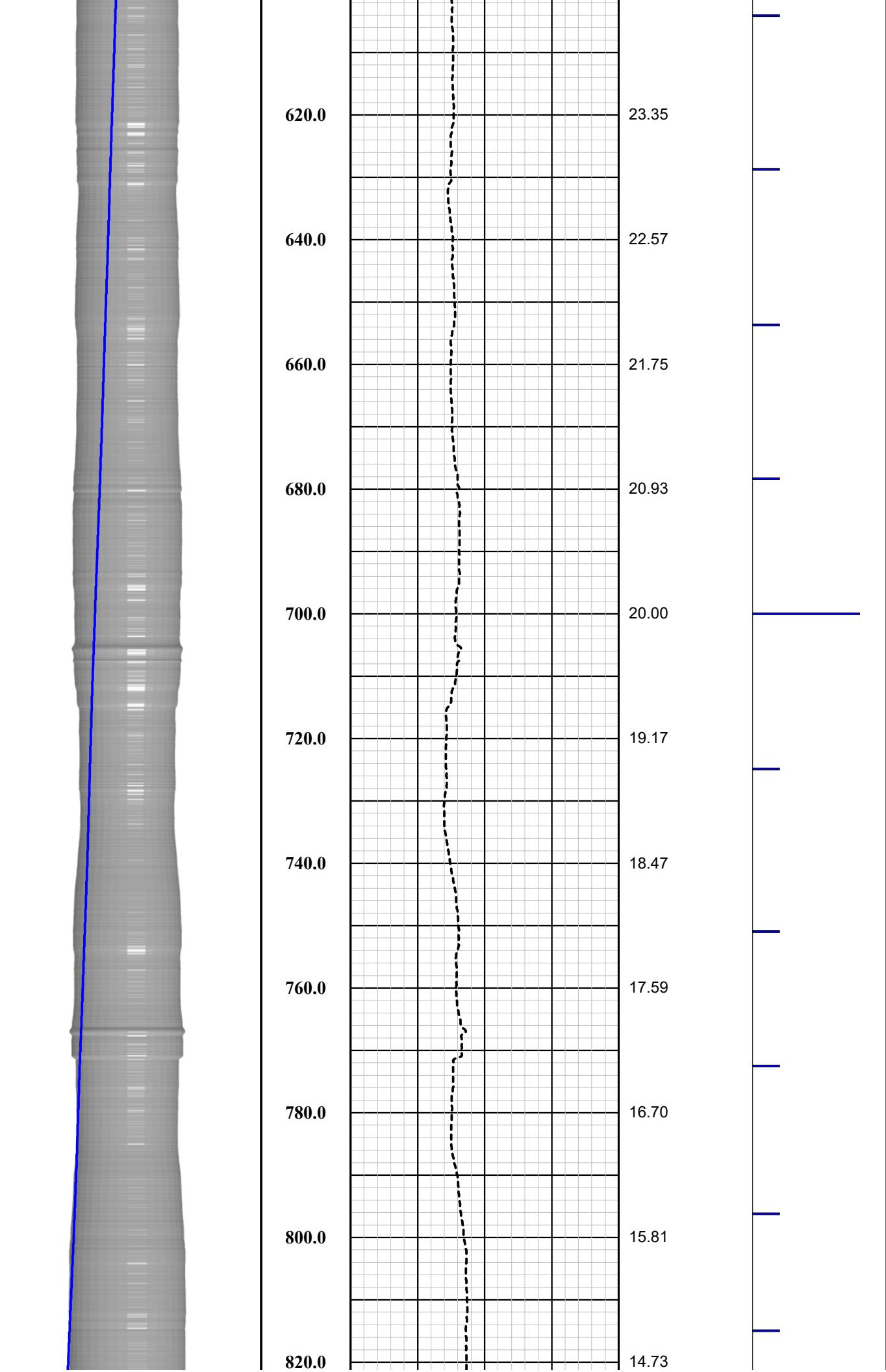
**Disclaimer:**

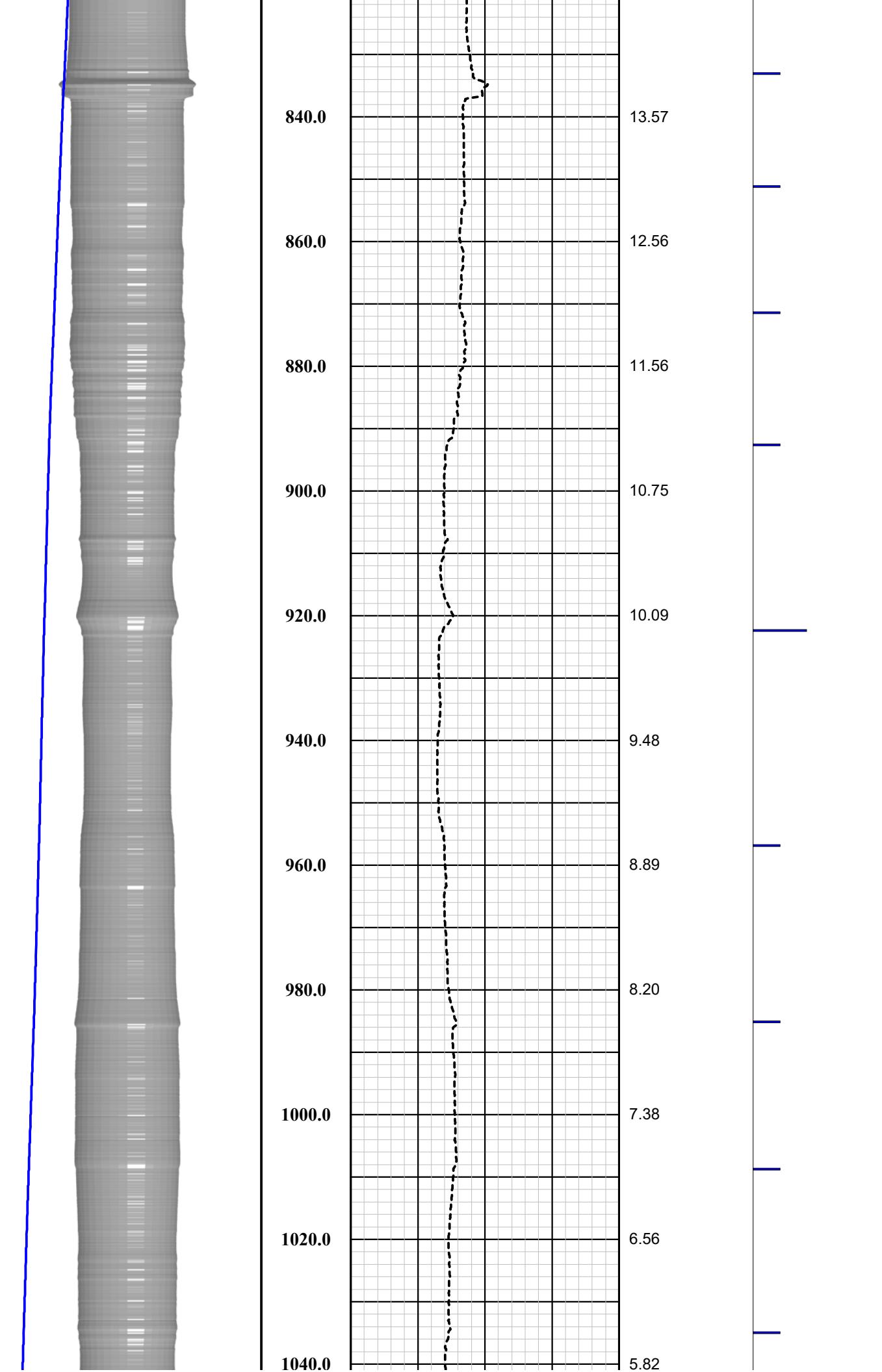
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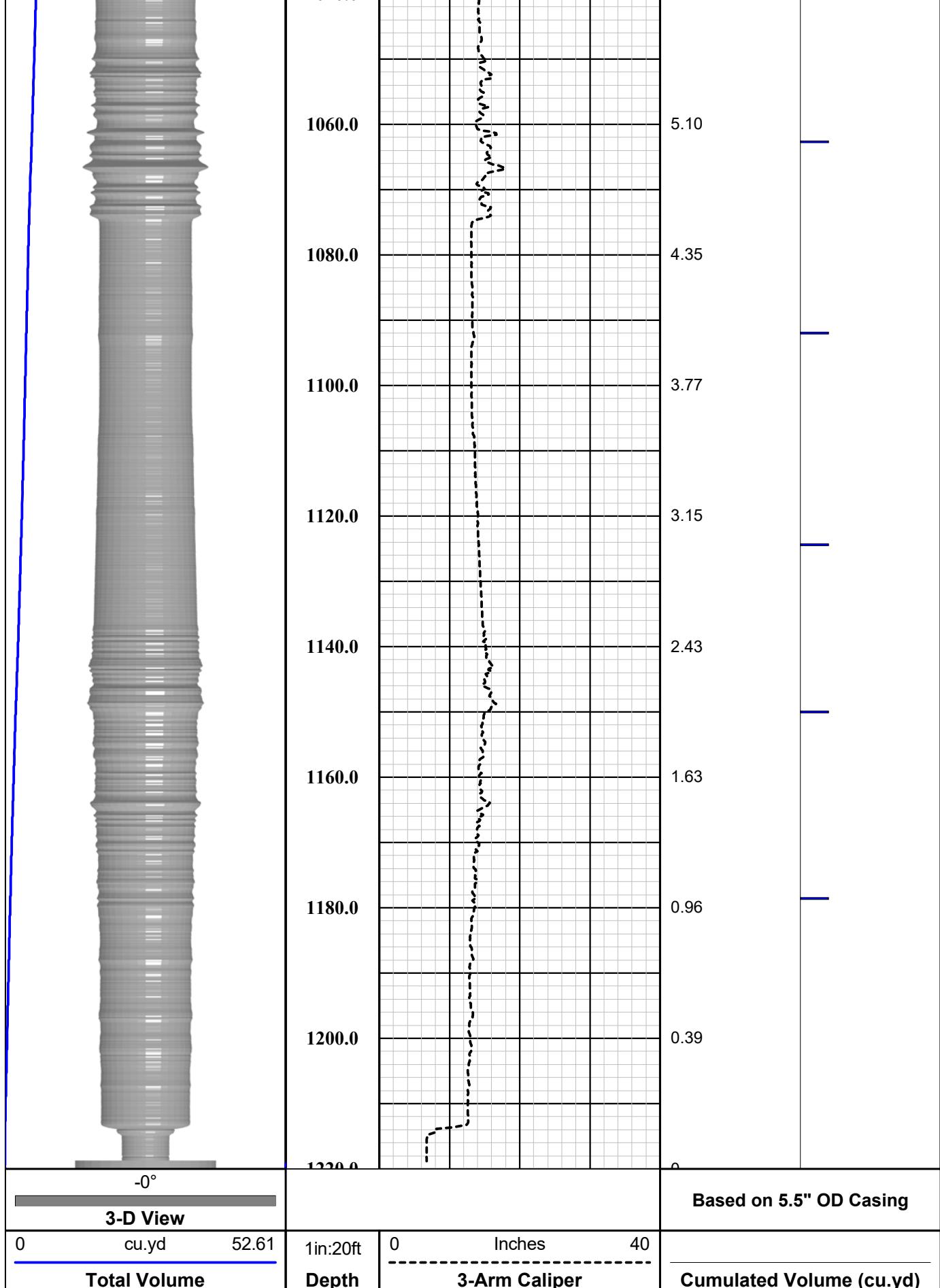












## MSI Gamma-Caliper-Temperature-Fluid Resistivity

Probe Top = Depth Ref.



### **Single Conductor MSI Probe Top**

**Probe Length = 2.59 m or 8.5 ft**

**Probe Weight = 6.80 kg or 15.0 lbs**

**Natural Gamma and Caliper can only be collected logging up hole.**

**Fluid Temperature/Resistivity can only be collected logging down hole.**

**Temperature Rating: 70 Deg C (158 Deg F)**

**Pressure Rating: 200 bar (2900 psi)**

**Natural Gamma Ray = 0.76 m (29.75 in)**

**\*NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized\***

**3-Arm Caliper = 1.44 m (56.75 in)**

**Distance from tool top: 2.20 m (86.5 in)**

**Available Arm Sizes: 3", 9", and 15"**

**TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)**

**1.375" or 34.9 mm Diameter**



**Southwest Exploration  
Services, LLC**

borehole geophysics & video services

Well  
Field  
County  
State

WB-04  
FLORENCE COPPER  
PINAL  
ARIZONA

**Final**

## **Caliper w / Volume Calculation Summary**

# Drift Report

## Wellbore DRIFT Interpretation

PREPARED ESPECIALLY FOR  
FLORENCE COPPER  
WB-04

Thursday - February 22, 2018

This Wellbore Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. We do not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and we will not be responsible for accidental or intentional interception of such data by third parties. Our employees are not empowered to change or otherwise modify the attached interpretation. Furthermore, along with Eagle Pro Software we do not warrant or guarantee the accuracy of the programming techniques employed to produce this document. By accepting this Interpretation Package, the Customer agrees to the foregoing, and to our General Terms and Conditions.



**Southwest Exploration Services, LLC**  
(480) 926-4558

# WELLBORE DRIFT INTERPRETATION

## Southwest Exploration Services, LLC

(480) 926-4558

Company:	<b>FLORENCE COPPER</b>		Well Owner:								
County:	PINAL		State:	Arizona		Country:	United States				
Well Number:	WB-04		Survey Date:	Thursday - February 22, 2018		Magnetic Declination:	Declination Correction Not Used				
Field:	<b>FLORENCE COPPER</b>		Drift Calculation Methodology:			Balanced Tangential Method					
Location:											
Remarks:											
Witness:	SCOTT - H&A	Vehicle No.:	900	Invoice No.:		Operator:	A. OLSON	Well Depth:	1220 Feet	Casing size:	12.25 Inches
Tool:	Compass - 6002		Lat.:		Long.:	Sec.:	Twp.:	Rge.:			

<b>MEASURED DATA</b>			<b>DATA COMPUTATIONS</b>						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
0	0.49	024.25	0.00						
20	0.62	110.98	19.99	0.039	0.136	1.00	7.80	0.14' (1.68")	073.90
40	0.60	015.02	39.98	0.101	0.264	0.41	8.44	0.28' (3.36")	069.00
60	0.45	197.11	59.97	0.127	0.268	0.96	11.35	0.30' (3.60")	064.60
80	0.51	199.86	79.96	-0.032	0.215	0.84	0.27	0.22' (2.64")	098.40
100	0.50	202.89	99.96	-0.196	0.151	0.42	0.30	0.25' (3.00")	142.40
120	0.61	217.28	119.95	-0.361	0.053	0.13	1.42	0.36' (4.32")	171.70
140	0.68	196.88	139.94	-0.559	-0.046	0.43	2.01	0.56' (6.72")	184.70
160	0.43	209.04	159.93	-0.738	-0.117	0.83	1.20	0.75' (9.00")	189.00
180	0.68	214.55	179.92	-0.901	-0.221	0.95	0.55	0.93' (11.16")	193.80
200	0.83	211.40	199.91	-1.122	-0.364	0.37	0.31	1.18' (14.16")	198.00
220	0.38	174.87	219.90	-1.312	-0.434	1.00	3.56	1.38' (16.56")	198.30
240	0.47	185.88	239.89	-1.460	-0.436	1.00	1.09	1.52' (18.24")	196.60
260	0.41	211.64	259.88	-1.603	-0.482	0.34	2.53	1.67' (20.04")	196.70
280	0.27	194.72	279.87	-1.709	-0.532	0.93	1.67	1.79' (21.48")	197.30
300	0.68	204.25	299.86	-1.863	-0.593	0.78	0.94	1.95' (23.40")	197.70
320	0.37	221.94	319.85	-2.019	-0.685	0.53	1.75	2.13' (25.56")	198.70
340	0.50	200.81	339.84	-2.149	-0.759	0.00	2.08	2.28' (27.36")	199.50

Page No. 1      True Vertical Depth: **1219.41'**      Final Drift Distance: **4.06'** (48.72")      Final Drift Bearing: **112.70°**

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

# WELLBORE DRIFT INTERPRETATION

## Southwest Exploration Services, LLC

(480) 926-4558

WB-04

MEASURED DATA			DATA COMPUTATIONS						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
360	0.58°	210.48°	359.83	-2.318	-0.841	0.56	0.96	2.47' (29.64")	200.00
380	0.53°	173.88°	379.82	-2.497	-0.882	0.73	3.57	2.65' (31.80")	199.50
400	0.22°	192.87°	399.81	-2.626	-0.881	0.88	1.87	2.77' (33.24")	198.50
420	0.38°	218.52°	419.80	-2.715	-0.931	0.20	2.52	2.87' (34.44")	198.90
440	0.43°	219.43°	439.79	-2.825	-1.020	0.97	0.09	3.00' (36.00")	199.90
460	0.35°	235.85°	459.78	-2.917	-1.118	0.96	1.62	3.12' (37.44")	201.00
480	0.49°	211.70°	479.77	-3.024	-1.213	0.12	2.38	3.26' (39.12")	201.90
500	0.40°	216.76°	499.76	-3.153	-1.300	0.81	0.50	3.41' (40.92")	202.40
520	0.17°	172.01°	519.75	-3.238	-1.338	0.59	4.32	3.50' (42.00")	202.40
540	0.13°	249.07°	539.74	-3.275	-1.355	0.73	7.07	3.54' (42.48")	202.50
560	0.16°	221.78°	559.73	-3.304	-1.395	0.28	2.68	3.59' (43.08")	202.90
580	0.30°	201.30°	579.72	-3.374	-1.433	0.77	2.02	3.67' (44.04")	203.00
600	0.32°	205.59°	599.71	-3.473	-1.476	0.49	0.43	3.77' (45.24")	203.00
620	0.12°	114.91°	619.70	-3.532	-1.481	0.69	8.08	3.83' (45.96")	202.70
640	0.11°	317.90°	639.69	-3.527	-1.475	0.13	11.13	3.82' (45.84")	202.70
660	0.19°	274.16°	659.68	-3.510	-1.521	0.83	4.23	3.83' (45.96")	203.40
680	0.18°	213.39°	679.67	-3.534	-1.571	0.80	5.74	3.87' (46.44")	204.00
700	0.18°	208.39°	699.66	-3.588	-1.603	0.25	0.50	3.93' (47.16")	204.10
720	0.17°	124.89°	719.65	-3.633	-1.594	0.54	7.56	3.97' (47.64")	203.70
740	0.30°	070.40°	739.64	-3.632	-1.520	0.24	5.20	3.94' (47.28")	202.70
760	0.44°	058.90°	759.63	-3.575	-1.405	0.94	1.14	3.84' (46.08")	201.50
780	0.31°	034.90°	779.62	-3.491	-1.308	0.65	2.36	3.73' (44.76")	200.50
800	0.23°	124.65°	799.61	-3.469	-1.244	0.97	8.01	3.69' (44.28")	199.70
820	0.31°	109.02°	819.60	-3.509	-1.160	0.06	1.54	3.70' (44.40")	198.30
840	0.55°	043.40°	839.59	-3.457	-1.043	0.29	6.15	3.61' (43.32")	196.80
860	0.52°	042.57°	859.58	-3.320	-0.916	0.57	0.08	3.44' (41.28")	195.40
880	0.37°	056.39°	879.57	-3.217	-0.801	0.47	1.37	3.32' (39.84")	194.00
900	0.42°	071.58°	899.56	-3.158	-0.678	0.42	1.50	3.23' (38.76")	192.10
920	0.36°	085.13°	919.55	-3.130	-0.546	0.69	1.34	3.18' (38.16")	189.90
940	0.74°	090.80°	939.54	-3.126	-0.354	0.04	0.56	3.15' (37.80")	186.50
960	0.78°	088.19°	959.53	-3.124	-0.089	0.30	0.26	3.12' (37.44")	181.60
980	0.62°	079.39°	979.52	-3.100	0.153	0.98	0.87	3.10' (37.20")	177.20
1,000	0.84°	056.75°	999.52	-3.000	0.382	0.95	2.23	3.02' (36.24")	172.70

# **WELLBORE DRIFT INTERPRETATION**

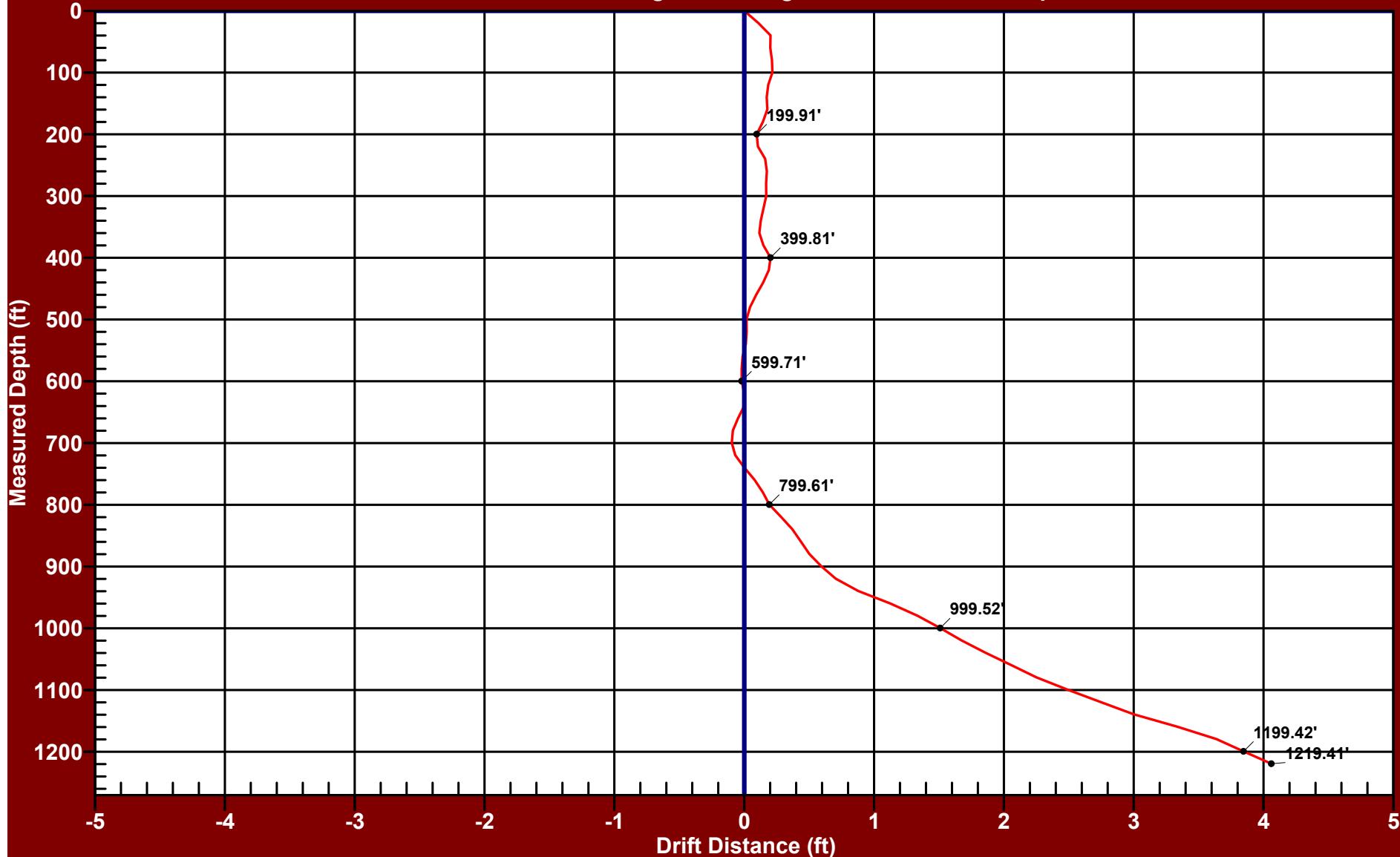
Southwest Exploration Services, LLC  
(480) 926-4558

WB-04

# PLANE OF DRIFT VIEW - WB-04

FLORENCE COPPER

Drift Distance = 4.06 Feet      Drift Bearing = 112.7 Degrees      True Vertical Depth = 1219.41 Feet



Date of Survey: Thursday - February 22, 2018

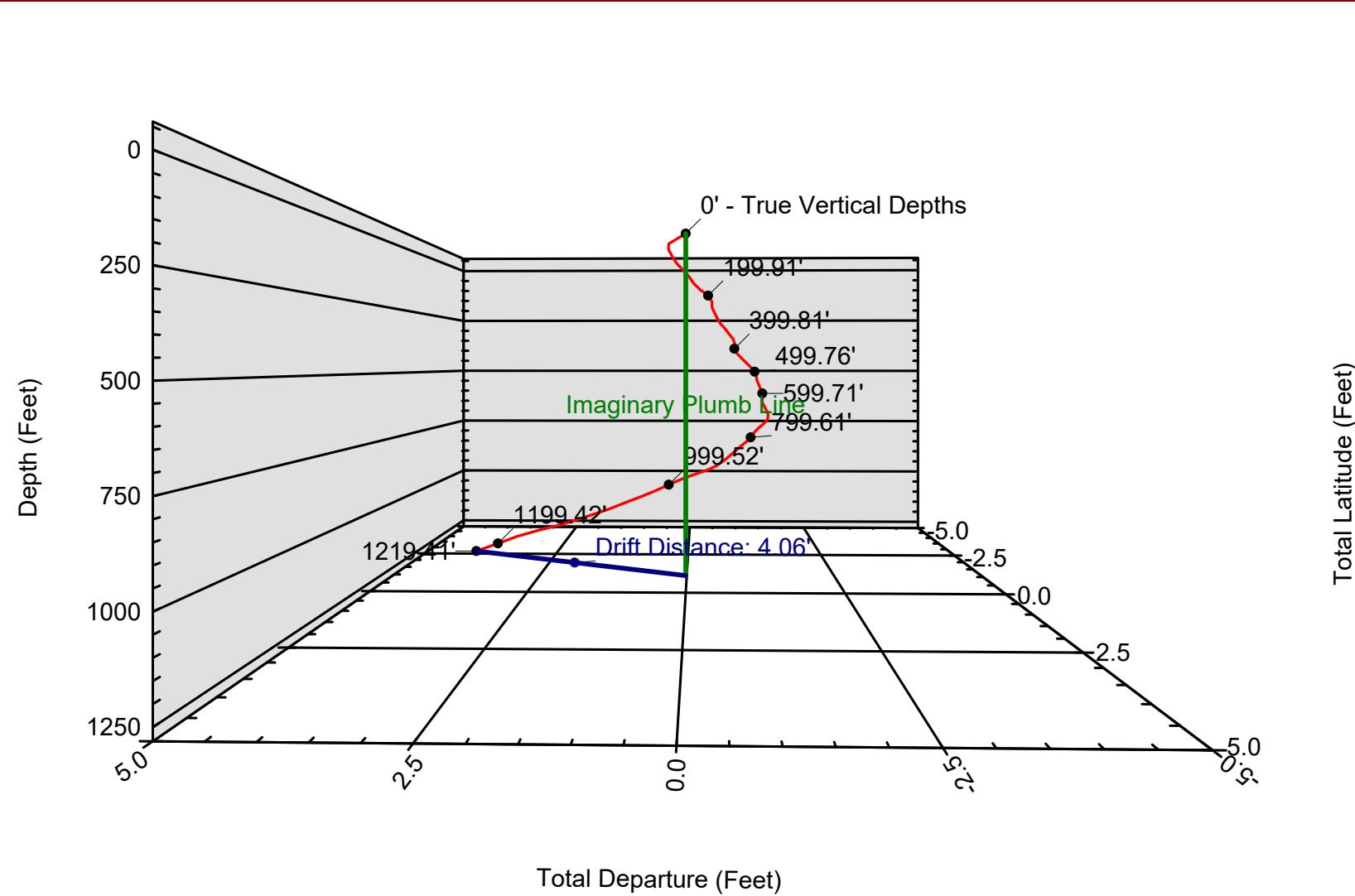
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# 3D PROJECTION VIEW - WB-04

## FLORENCE COPPER

Drift Distance = 4.06 Feet    Drift Bearing = 112.7 Degrees    True Vertical Depth = 1219.41 Feet



Date of Survey: Thursday - February 22, 2018

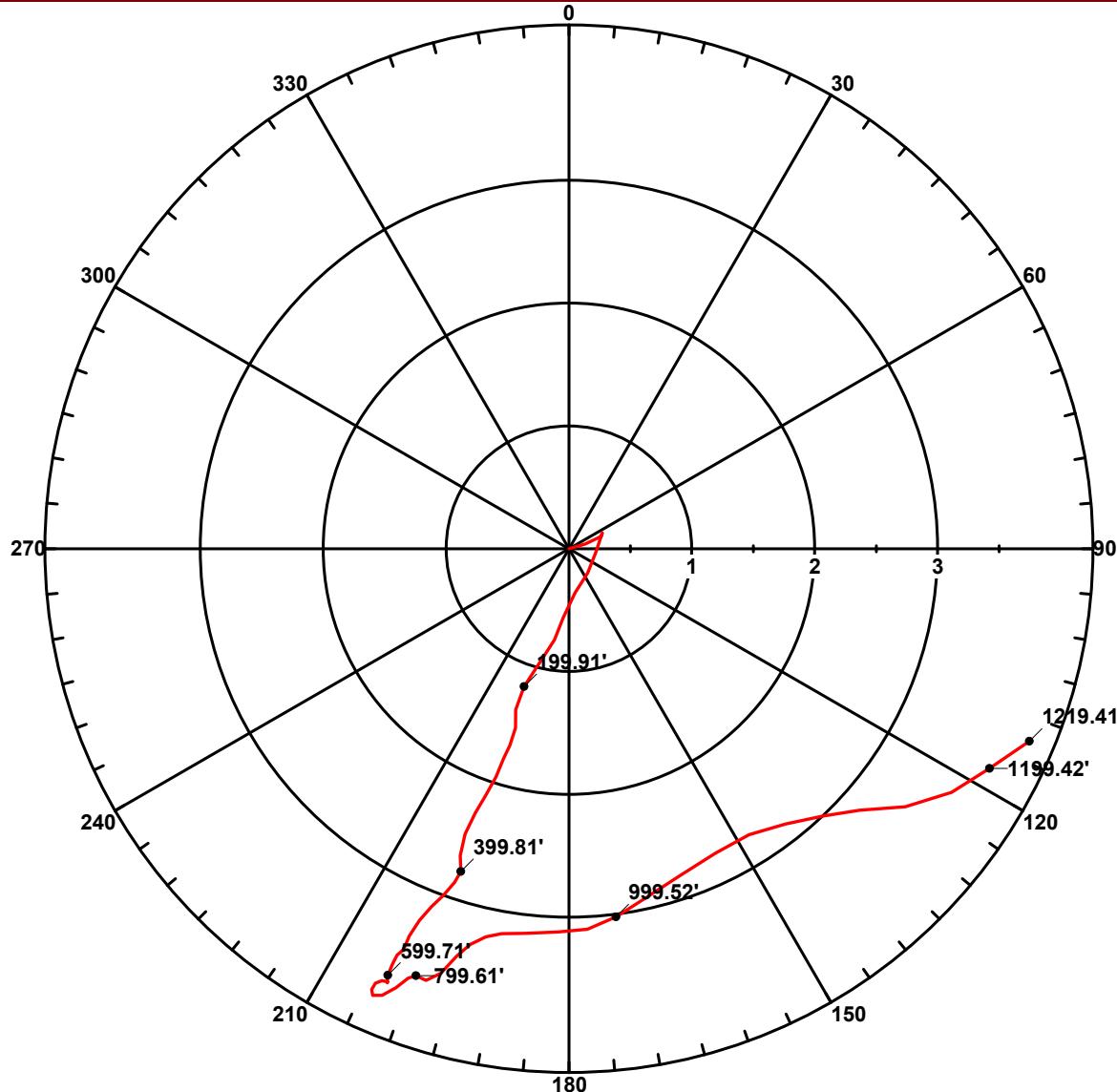
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# POLAR VIEW - WB-04

## FLORENCE COPPER

Drift Distance = 4.06 Feet    Drift Bearing = 112.7 Degrees    True Vertical Depth = 1219.41 Feet



Date of Survey: Thursday - February 22, 2018

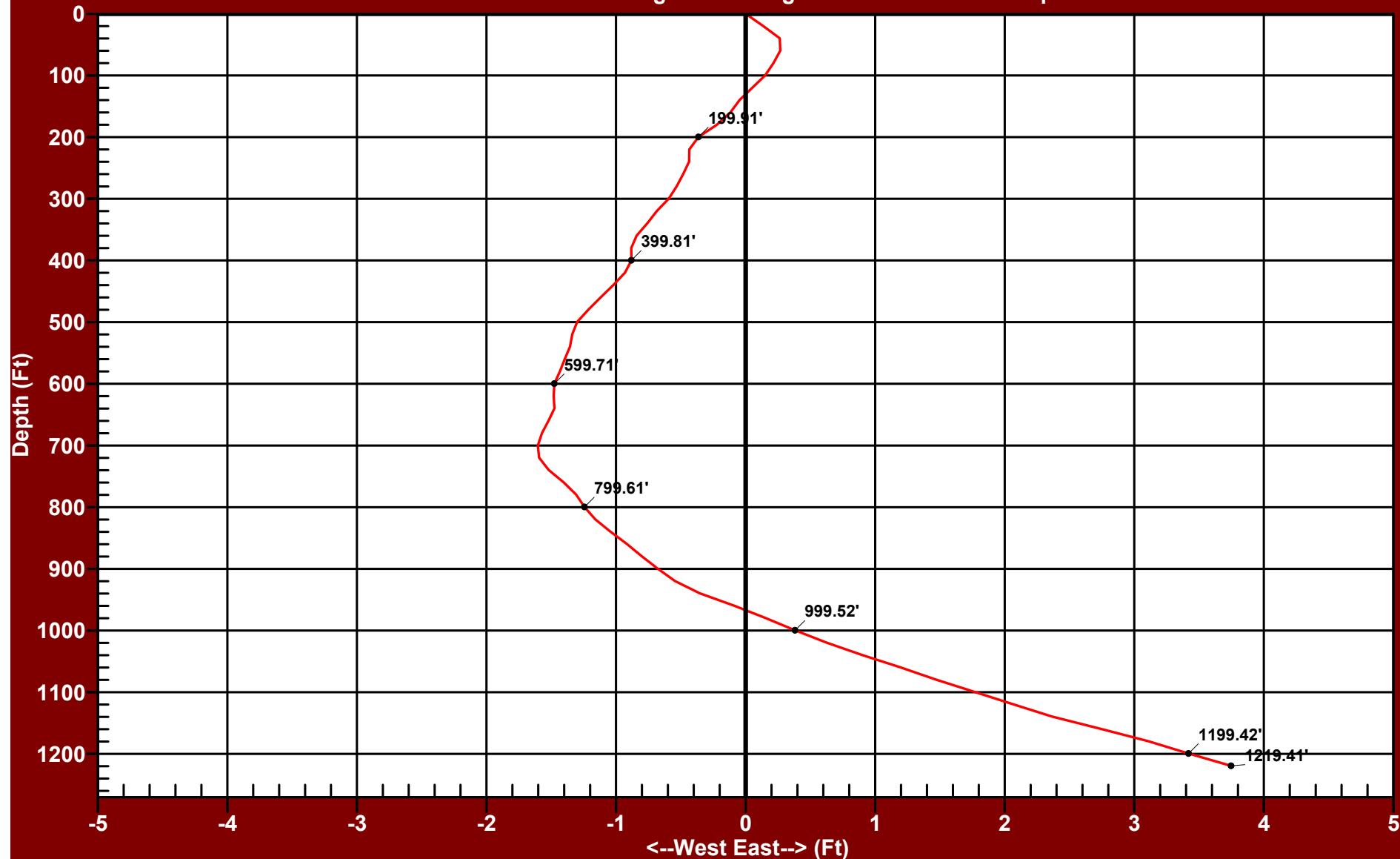
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# EASTING RECTANGULAR VIEW - WB-04

## FLORENCE COPPER

Drift Distance = 4.06 Feet      Drift Bearing = 112.7 Degrees      True Vertical Depth = 1219.41 Feet



Date of Survey: Thursday - February 22, 2018

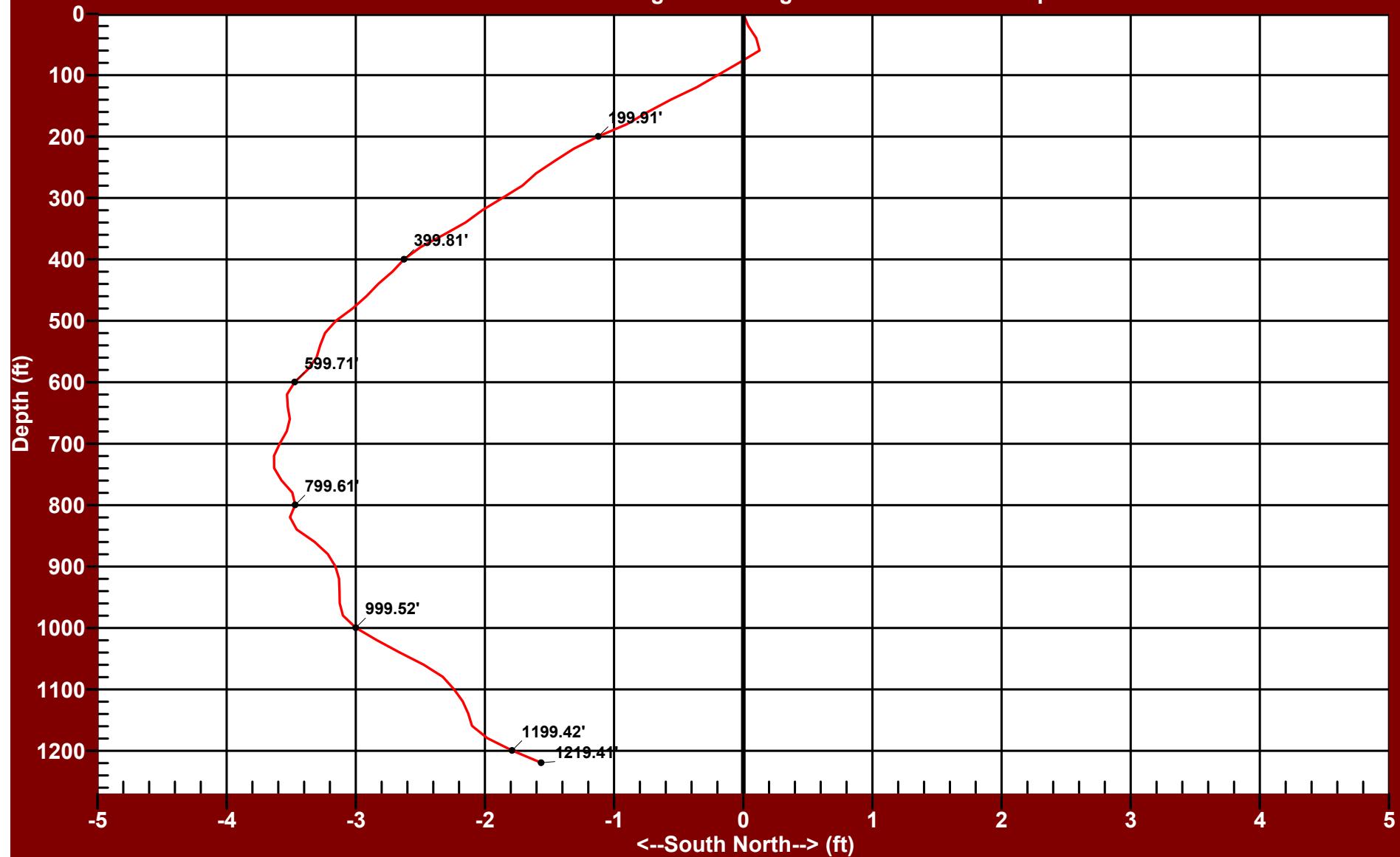
Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# NORTHING RECTANGULAR VIEW - WB-04

## FLORENCE COPPER

Drift Distance = 4.06 Feet      Drift Bearing = 112.7 Degrees      True Vertical Depth = 1219.41 Feet



Date of Survey: Thursday - February 22, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558



# Southwest Exploration Services, LLC

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borehole geophysics & video services

COMPANY	FLORENCE COPPER		
WELL ID	WB-04		
FIELD	FLORENCE COPPER		
COUNTY	PINAL		
STATE	ARIZONA		
TYPE OF LOGS: GAMMA - CALIPER		OTHER SERVICES	
MORE: TEMP. / FLUID RES.		SONIC	
LOCATION		4 P/DENSITY	
SEC	TWP	RGE	DUAL DENSITY
PERMANENT DATUM		ELEVATION	K.B.
LOG MEAS. FROM		GROUND LEVEL	ABOVE PERM. DATUM
DRILLING MEAS. FROM GROUND LEVEL			
DATE	4-6-18		
RUN No.	1		
TYPE LOG	GAMMA - CALIPER - TFR		
DEPTH DRILLER	1175 FT.		
DEPTH-LOGGER	1173 FT.		
BTM LOGGED INTERVAL	1173 FT.		
TOP LOGGED INTERVAL	SURFACE		
DRILLER / RIG#	HYDRO RESOURCES		
RECORDED BY / Logging Eng.	A. OLSON / M. QUINONES		
WITNESSED BY	CHAD - H&A		
BOREHOLE RECORD		CASING RECORD	
NO.	BIT	FROM	TO
1	?	SURFACE	40 FT.
2	12 1/4 IN.	40 FT.	TOTAL DEPTH
3			4 IN.
		PVC	500 FT.
			TOTAL DEPTH
COMMENTS:			
.			

Tool Summary:					
Date	4-6-18	Date	4-6-18	Date	4-6-18
Run No.	1	Run No.	2	Run No.	3
Tool Model	MSI COMBO TOOL	Tool Model	ALT 4 RX SONIC	Tool Model	COMPROBE 4 PI
Tool SN	5543	Tool SN	4572	Tool SN	6009
From	SURFACE	From	200 FT.	From	SURFACE
To	1173 FT.	To	1173 FT.	To	1173 FT.
Recorded By	A. OLSON	Recorded By	A. OLSON	Recorded By	A. OLSON
Truck No	900	Truck No	900	Truck No	900
Operation Check	4-5-18	Operation Check	4-5-18	Operation Check	4-5-18
Calibration Check	4-5-18	Calibration Check	N/A	Calibration Check	N/A
Time Logged	10:10 A.M.	Time Logged	11:00 A.M.	Time Logged	12:00 P.M.

Date	4-6-18	Date		Date	
Run No.	4	Run No.	5	Run No.	6
Tool Model	ALT QL DENSITY	Tool Model		Tool Model	
Tool SN	6187	Tool SN		Tool SN	
From	SURFACE	From		From	
To	1173 FT.	To		To	
Recorded By	A. OLSON	Recorded By		Recorded By	
Truck No	900	Truck No		Truck No	
Operation Check	4-5-18	Operation Check		Operation Check	
Calibration Check	N/A	Calibration Check		Calibration Check	
Time Logged	12:30 P.M.	Time Logged		Time Logged	

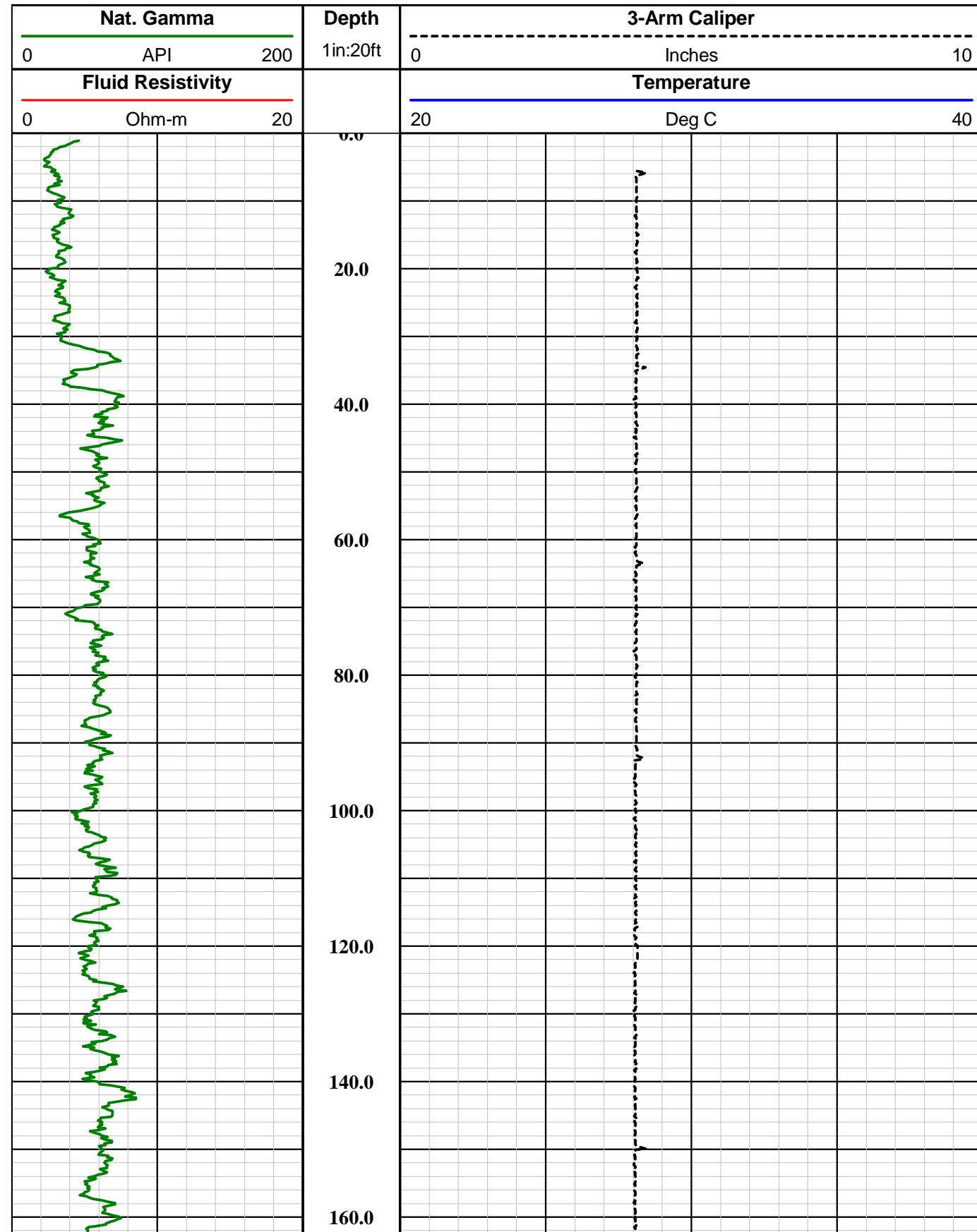
Additional Comments:					
Caliper Arms Used:	9 IN.	Calibration Points:	4 IN. & 12 IN.		
Comments:		Comments:		Comments:	

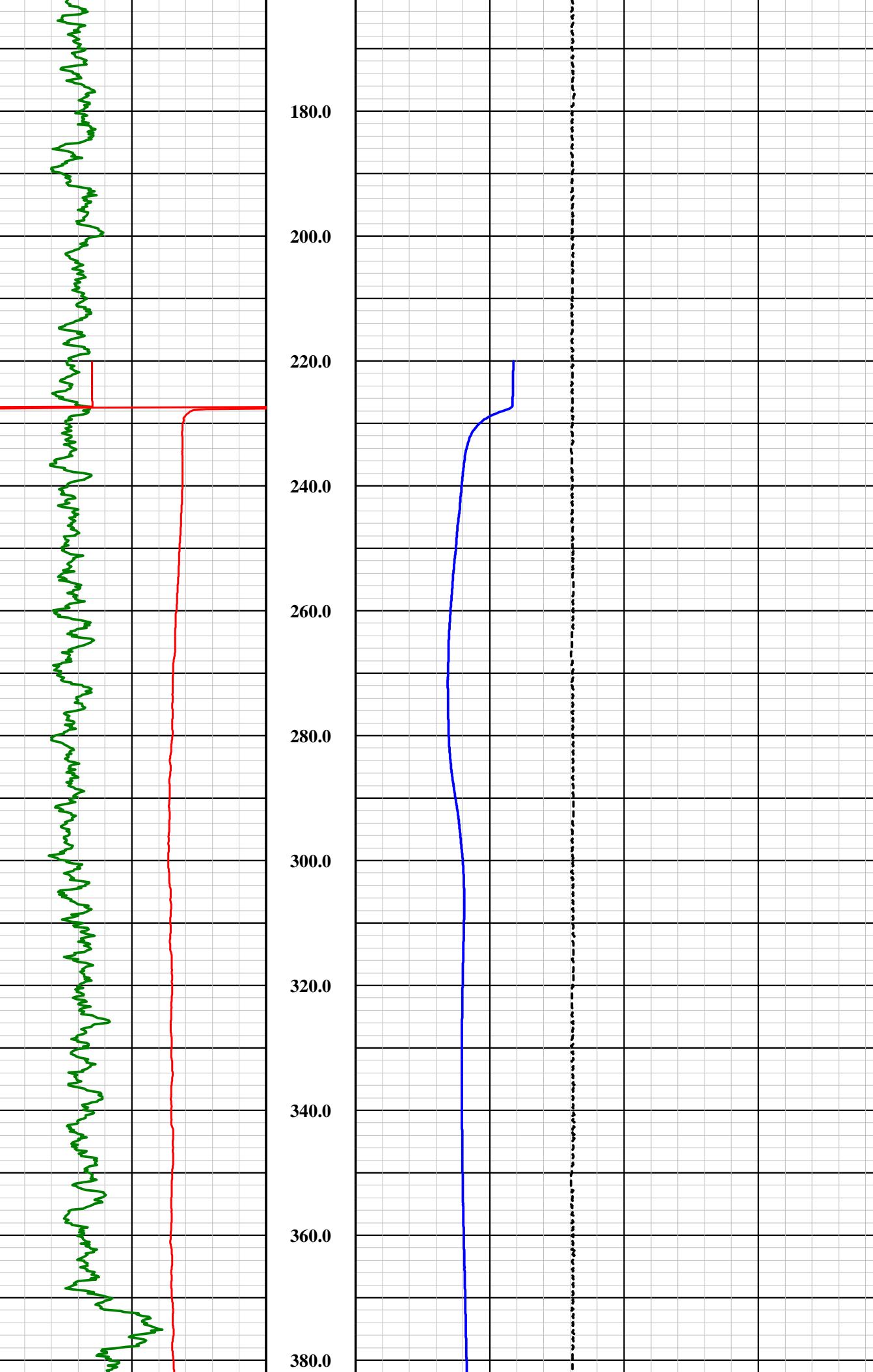
E-Log Calibration Range: N/A

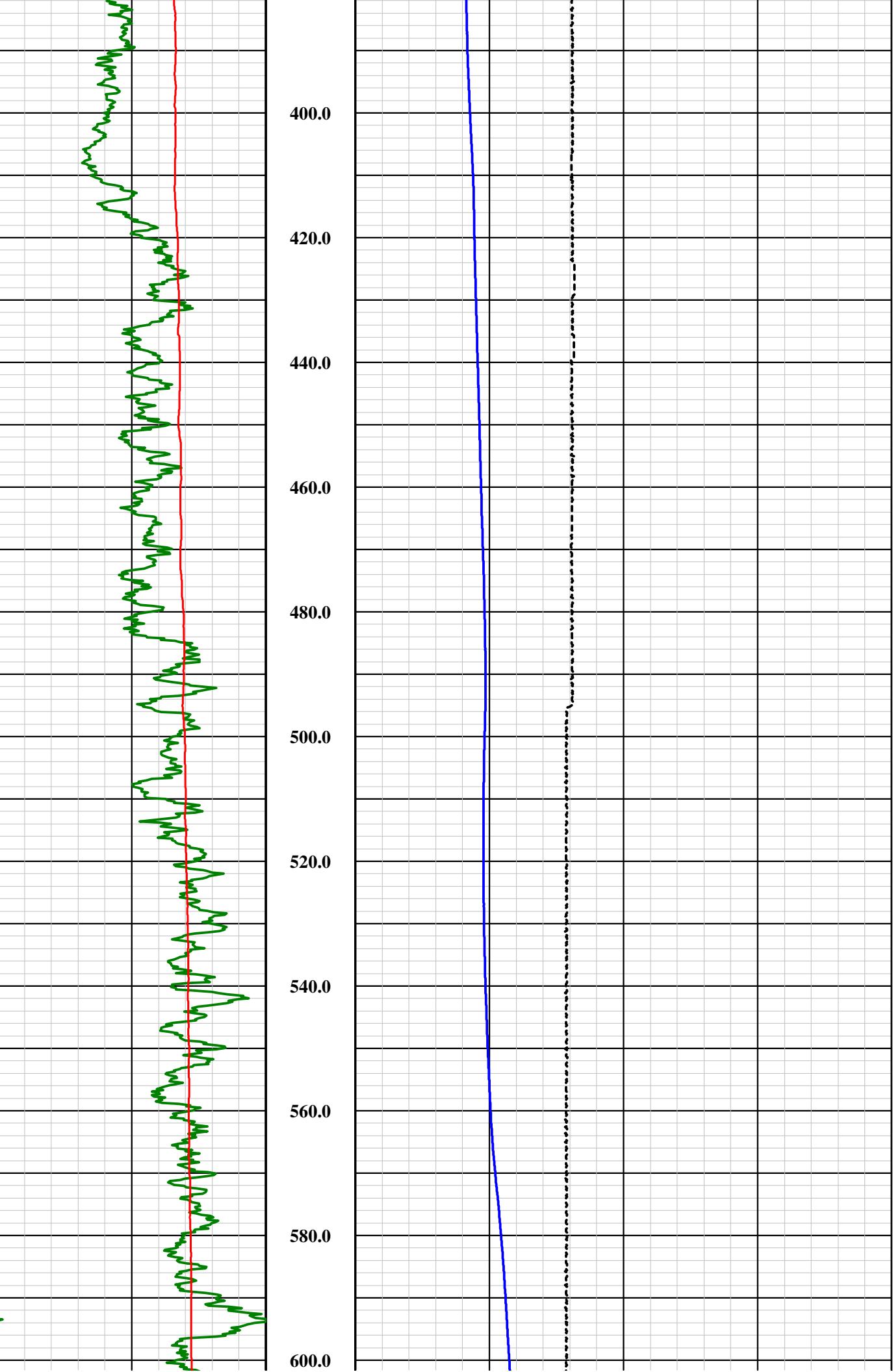
Calibration Points: N/A

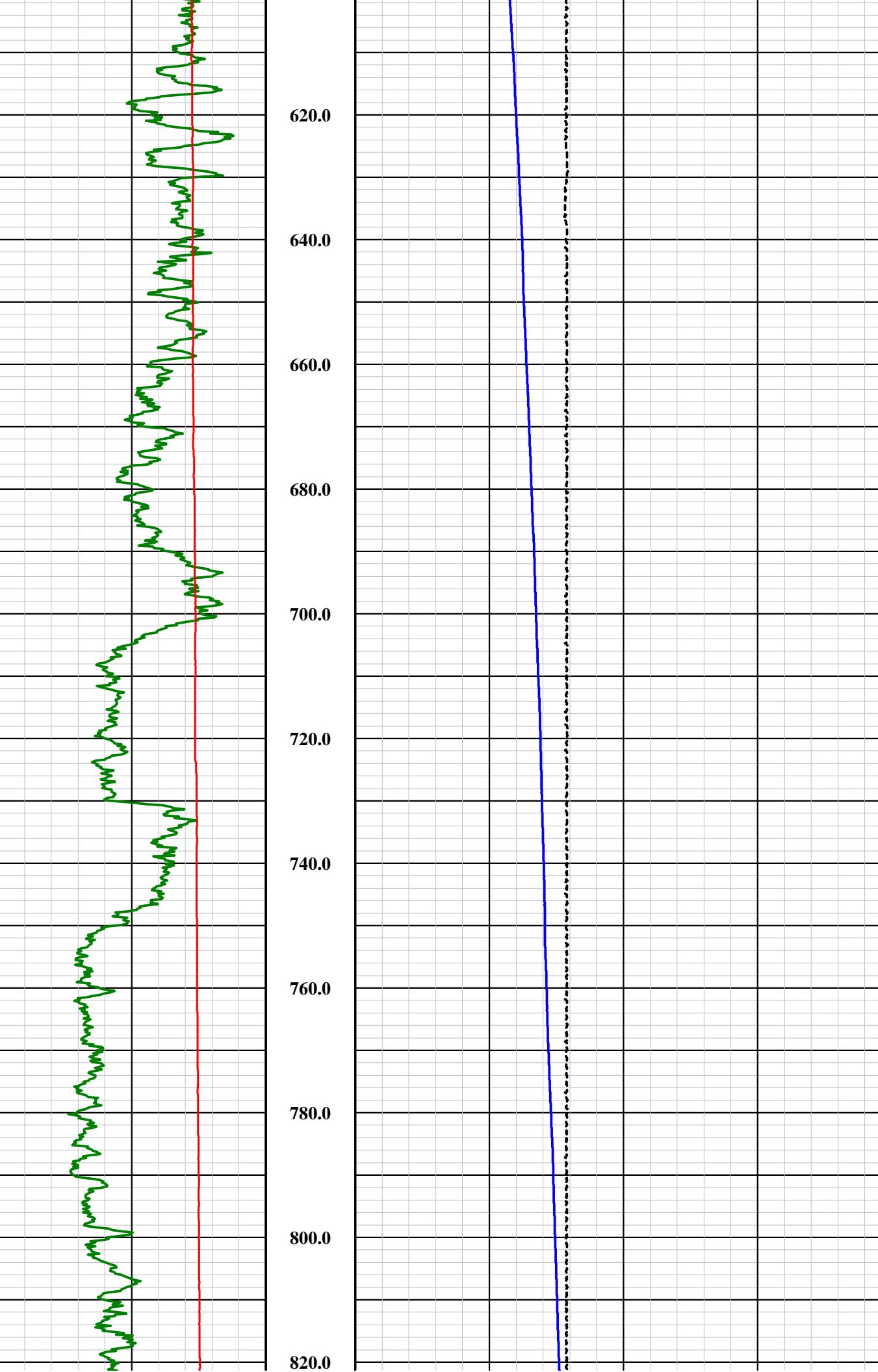
**Disclaimer:**

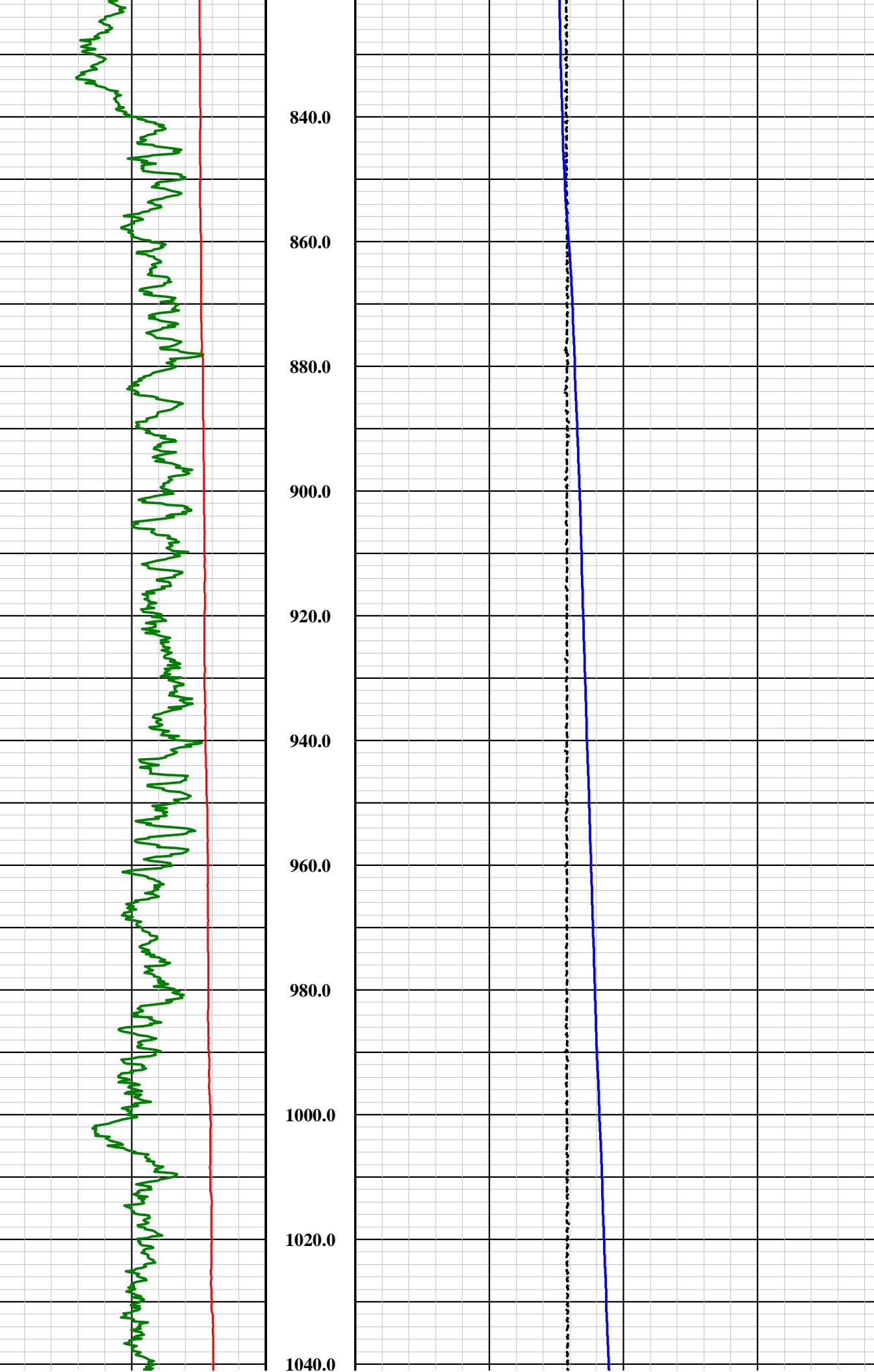
All interpretations of log data are opinions based on inferences from electrical or other measurements. We do not guarantee the accuracy or correctness of any interpretations or recommendations and shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by anyone resulting from any interpretation made by any of our employees or agents. These interpretations are also subject to our general terms and conditions set out in our current Service Invoice.

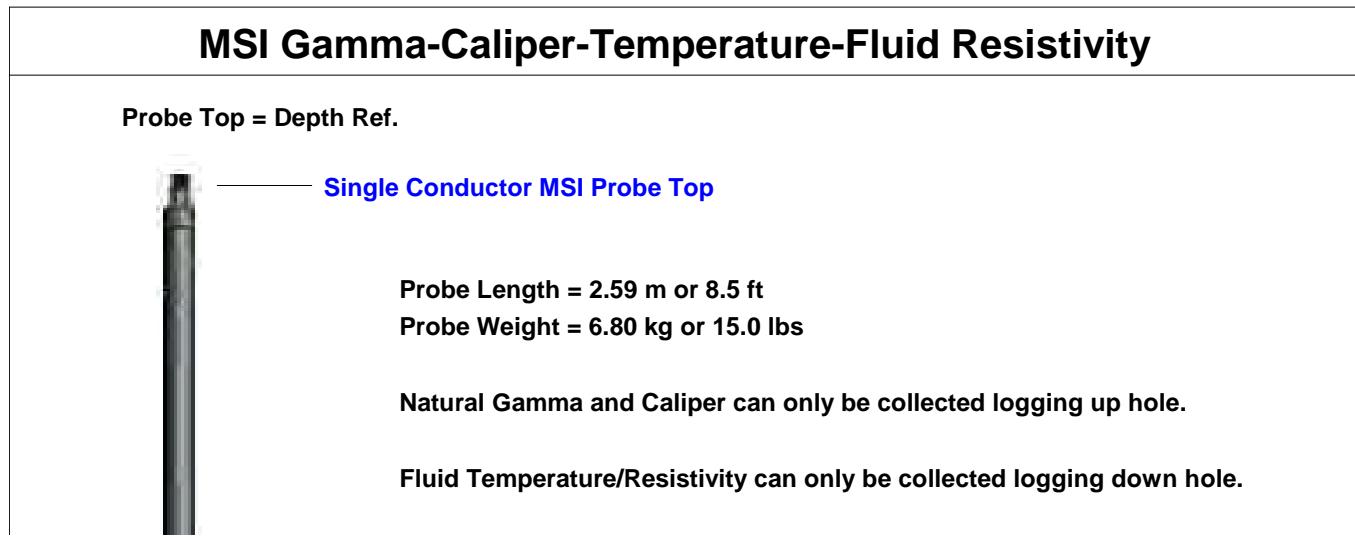
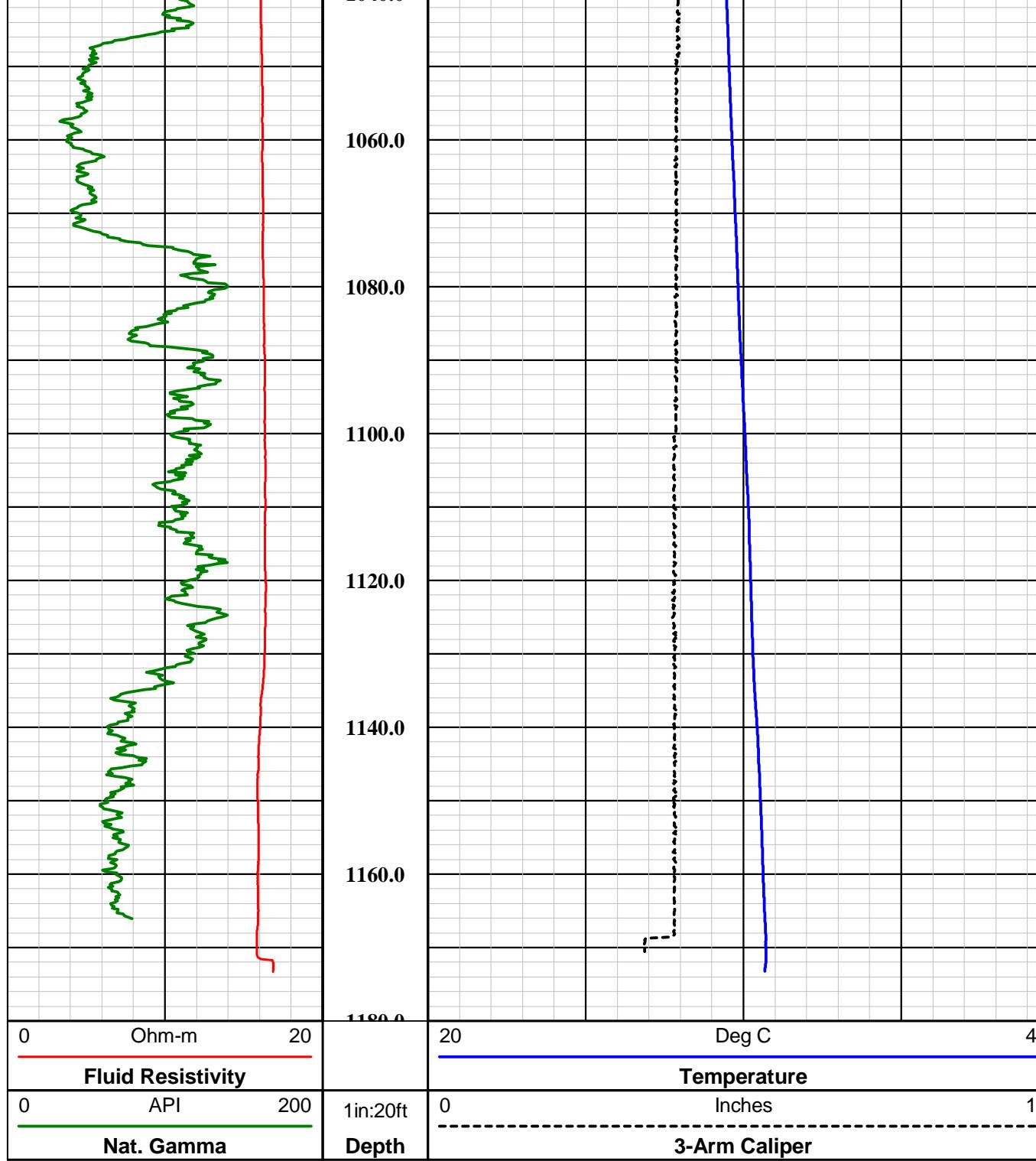












Temperature Rating: 70 Deg C (158 Deg F)  
Pressure Rating: 200 bar (2900 psi)

Natural Gamma Ray = 0.76 m (29.75 in)

\*NOTE: Lengths on a particular tool may vary from those listed on this document due to probe sizes and styles utilized\*

3-Arm Caliper = 1.44 m (56.75 in)

Distance from tool top: 2.20 m (86.5 in)

Available Arm Sizes: 3", 9", and 15"

TFR (Temperature/Fluid Resistivity) = 0.39 m (15.5 in)

1.375" or 34.9 mm Diameter

 <b>Southwest Exploration Services, LLC</b> borehole geophysics & video services	Company      FLORENCE COPPER Well           WB-04 Field          FLORENCE COPPER County        PINAL State          ARIZONA
Final	GCT Summary

**APPENDIX F**

**Cement Bond Log Summary**

WELL WB-04

## Geophysical Log Summary


**Southwest Exploration Services, LLC**  
 borehole geophysics & video services

 COMPANY: FLORENCE COPPER COMPANY  
 FIELD: FLORENCE COPPER SITE  
 WELL ID: WB-04  
 COUNTY: PINAL

STATE: ARIZONA

Logging Engineer: VARIOUS

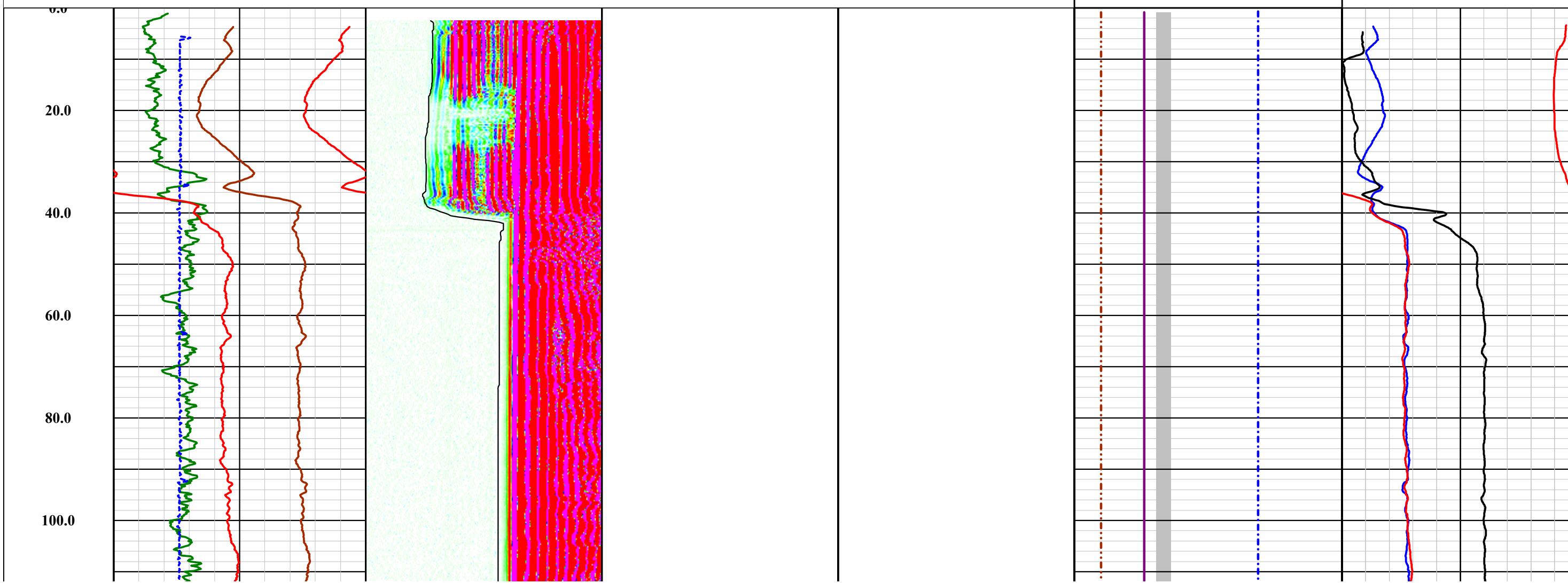
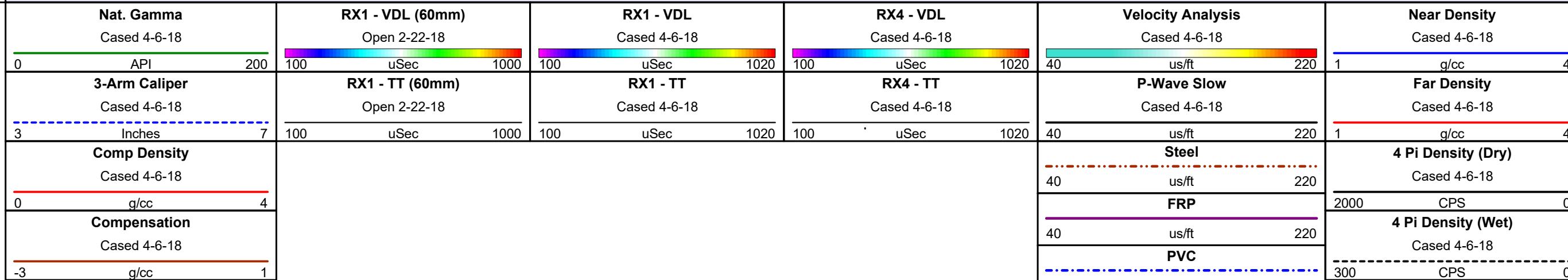
Date Logged: VARIOUS

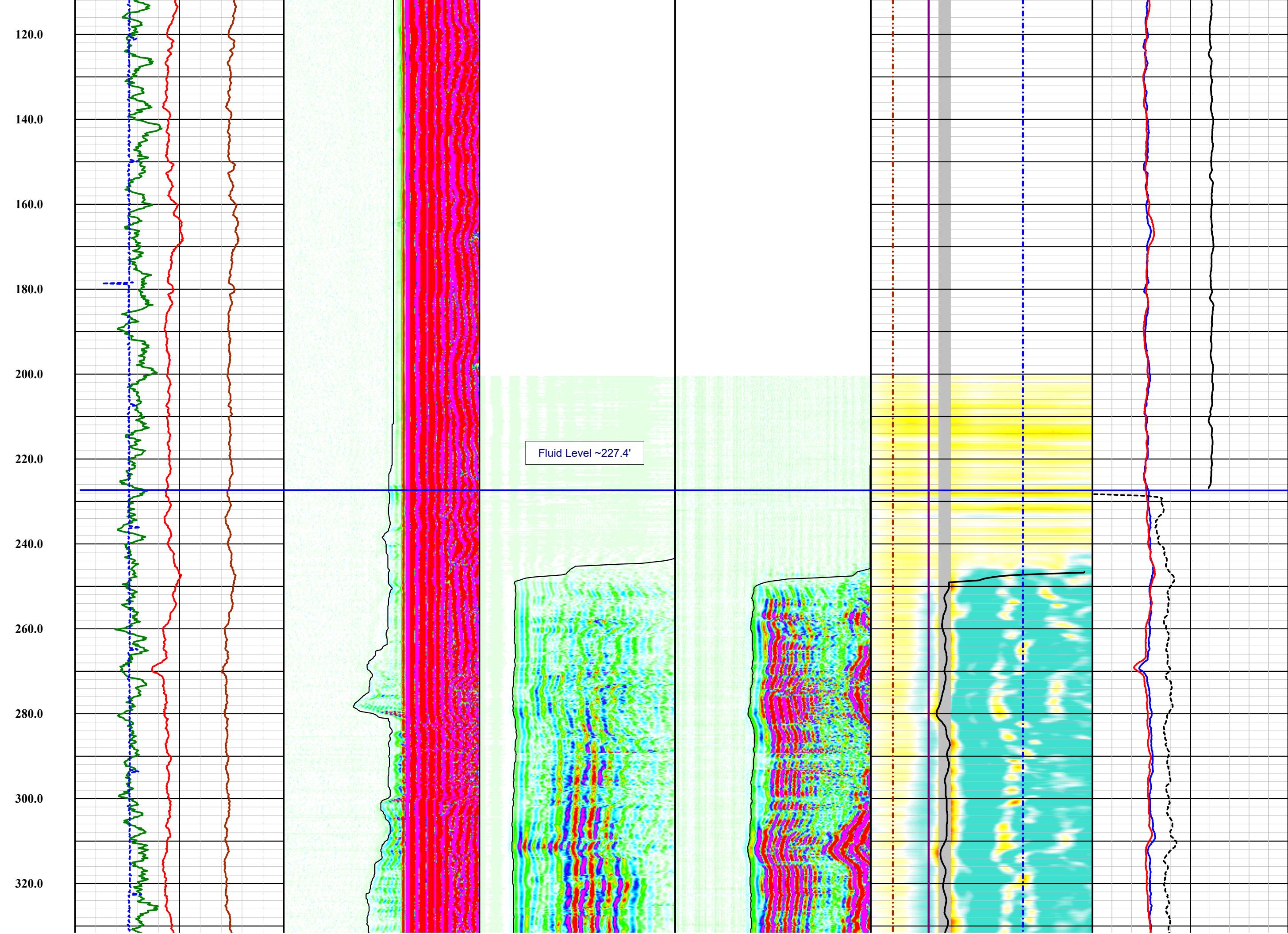
Processed By: K.M / B.C.

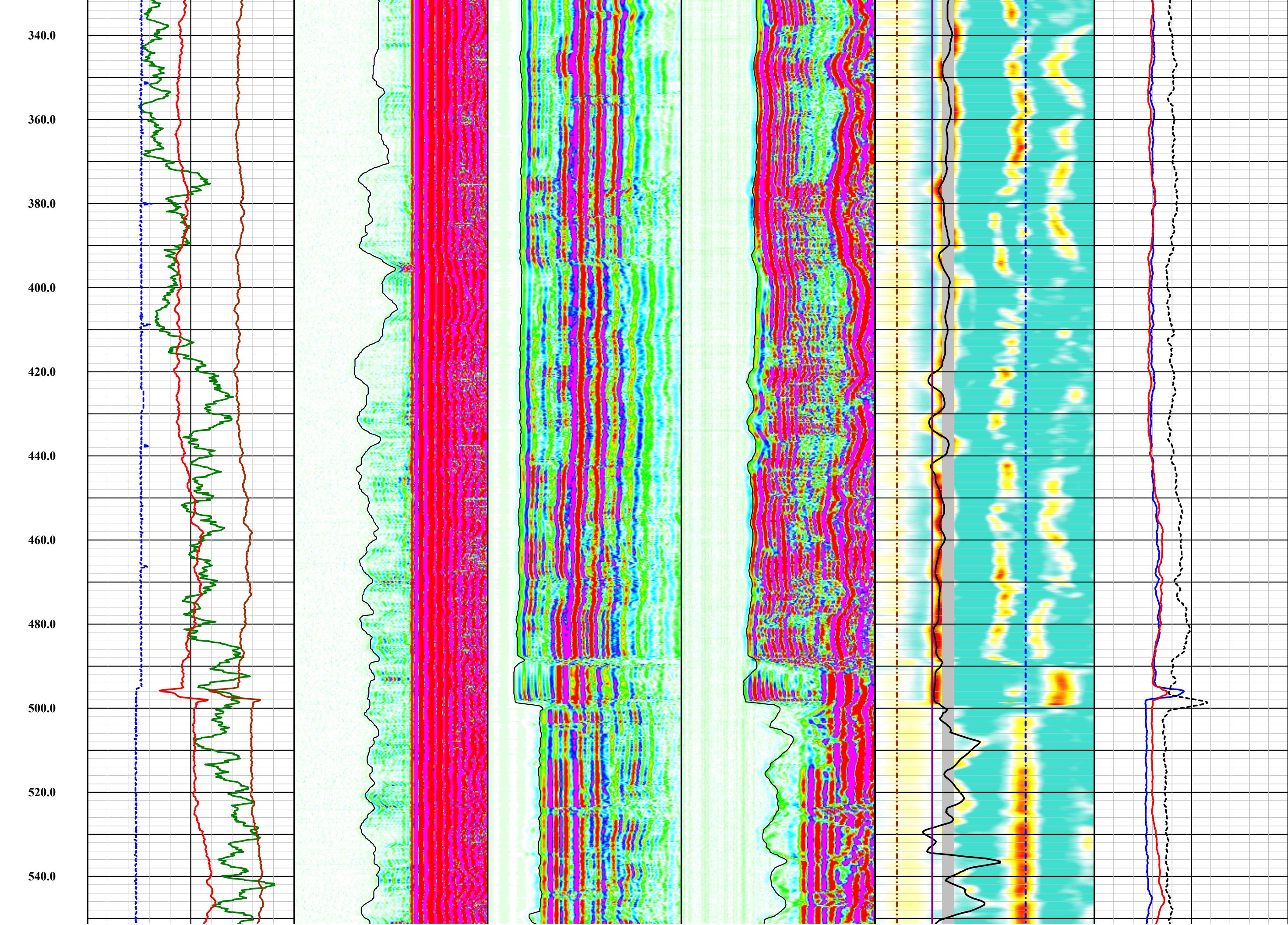
Date Processed: 07-17-18

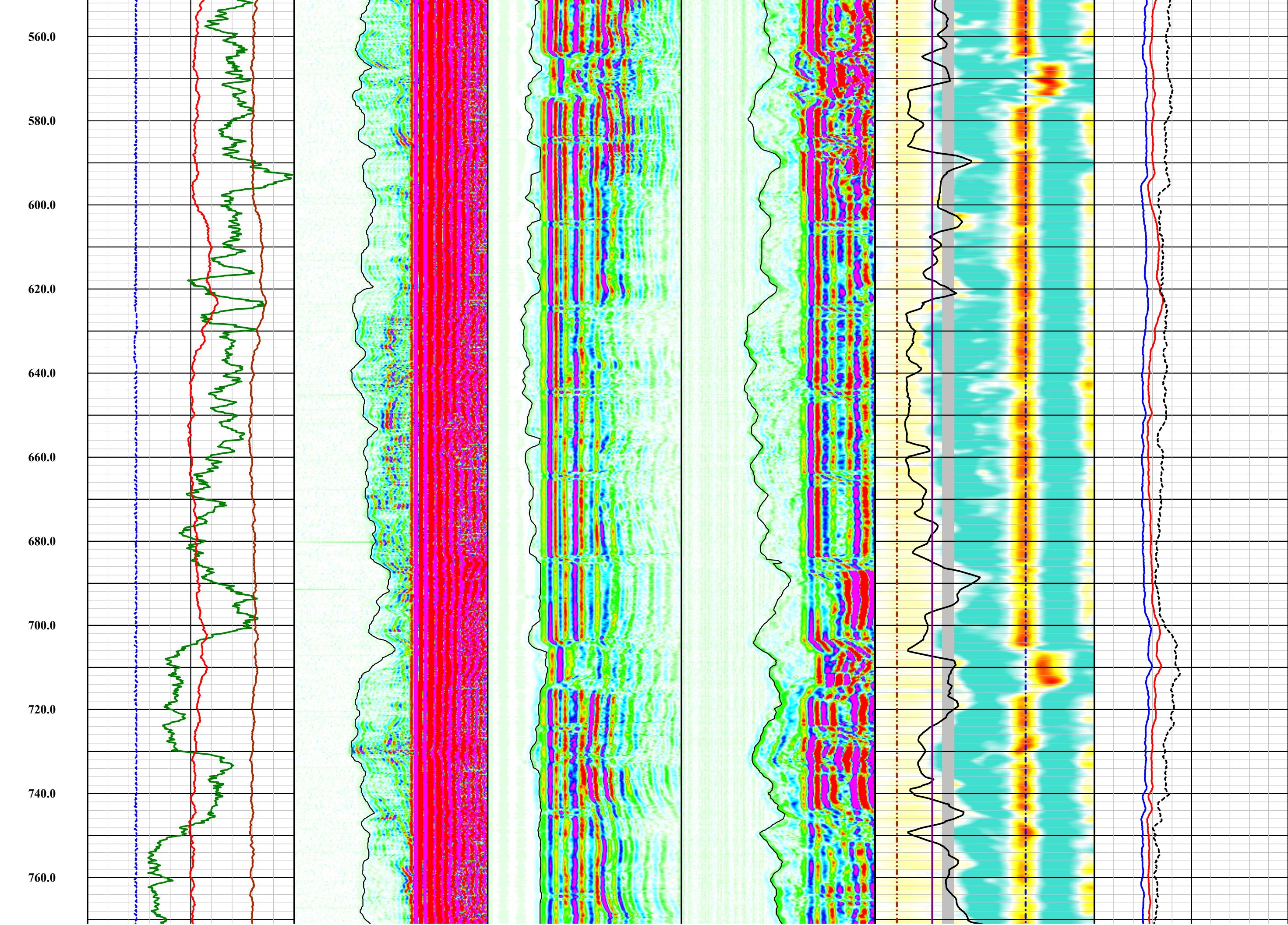

Depth  
1in:20ft

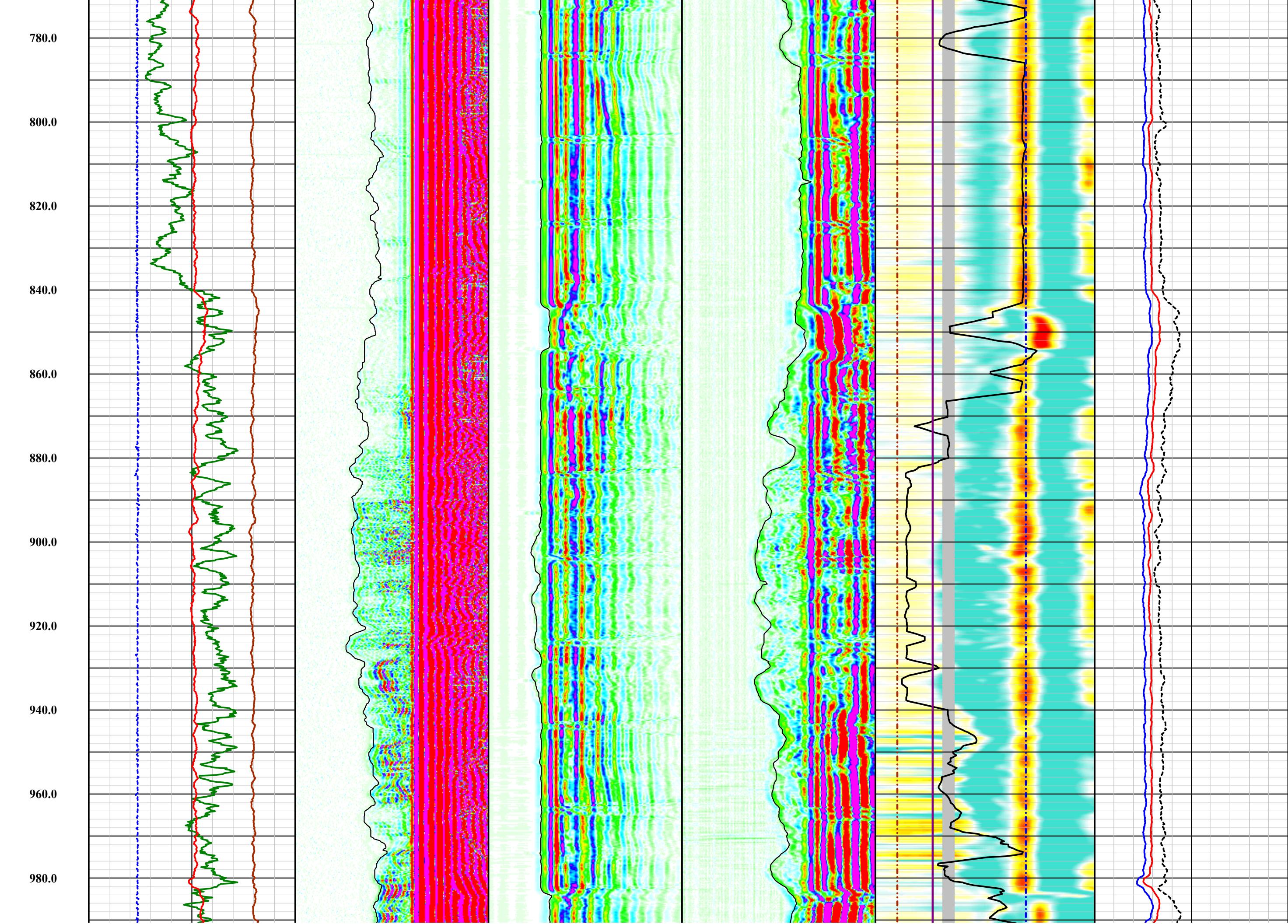
## WB-04 Sonic CBL with Density Summary

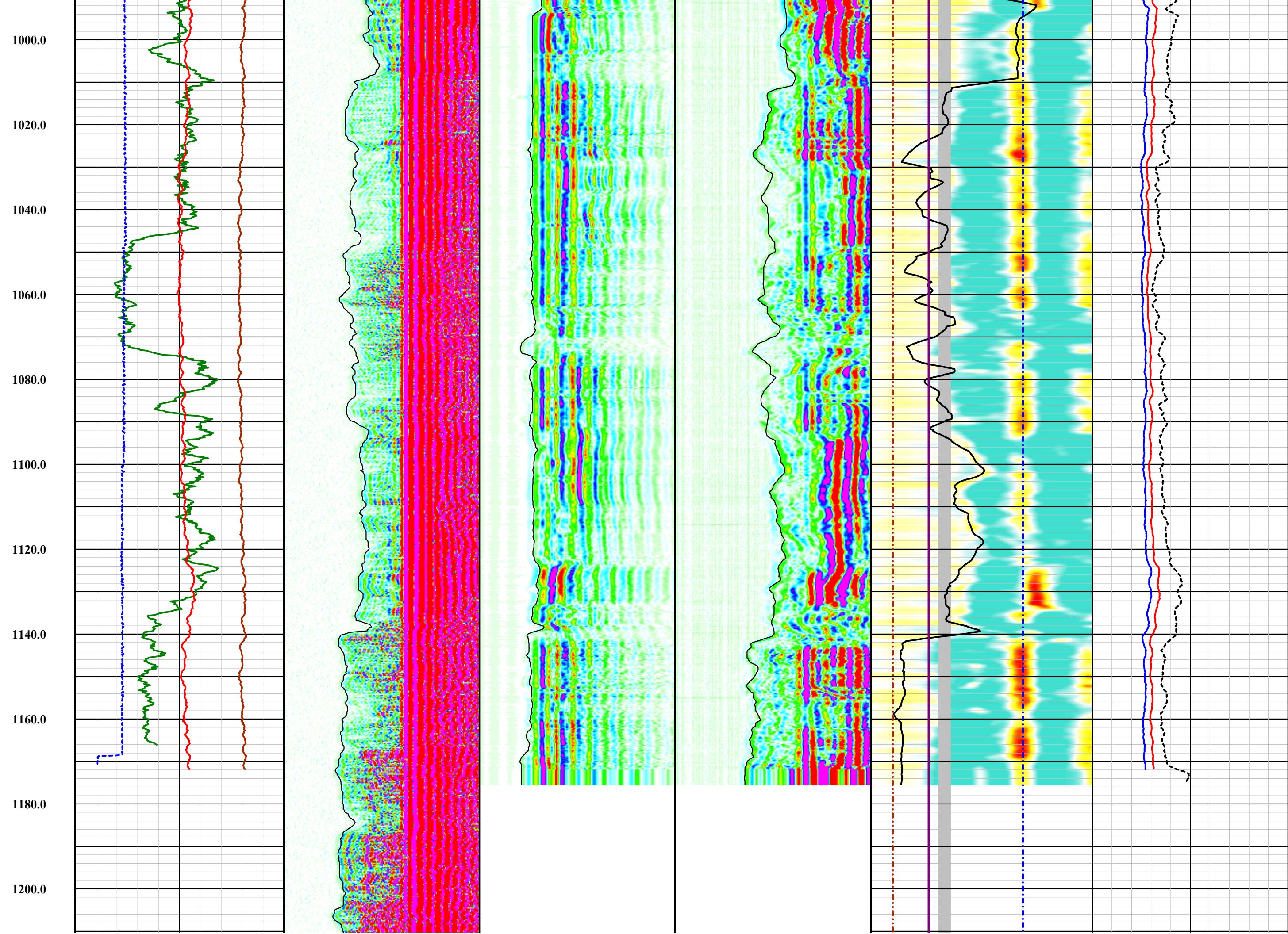


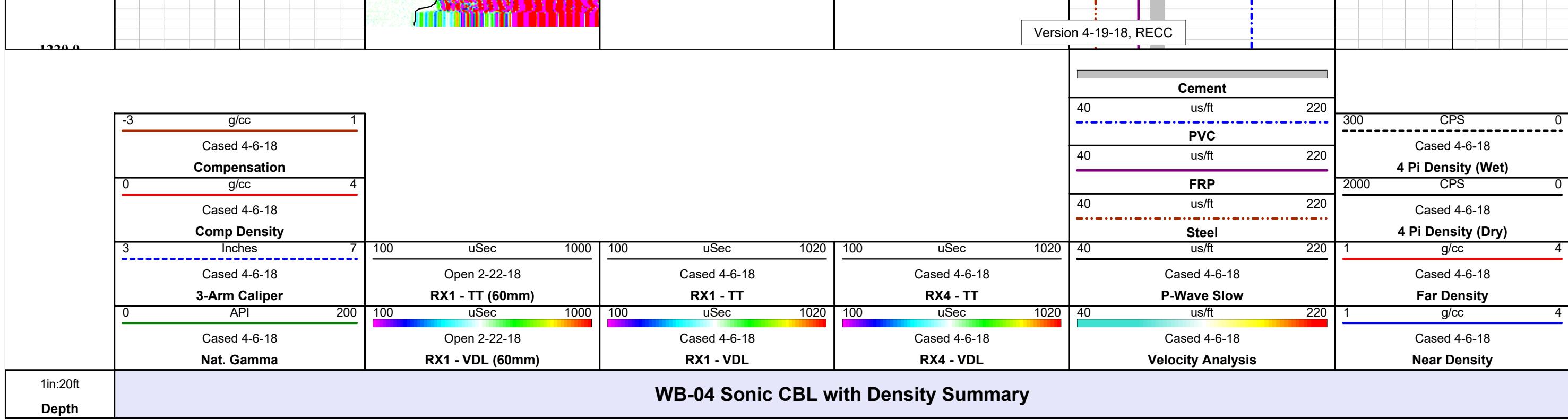












# WB-04 Sonic CBL with Density Summary

**APPENDIX G**

**SAPT Documentation**

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
STANDARD ANNULAR PRESSURE TEST

Operator	FLORENCE COPPER, INC			State Permit No.	P-101704						
Address	1575 W. HUNT HWY			USEPA Permit No.	R9UIC-AZ3-FY11-1						
	FLORENCE, AZ 85132			Date of Test	4/7/2018						
Well Name	WB-04			Well Type	ENV-MONITORING- Class III						
<u>LOCATION INFORMATION</u>	SW	Quarter of the	NE	Quarter of the	SW	Quarter					
of Section	28	;	Range	9E	;	Township	4S	;	County	PINAL	;
Company Representative	IAN REAM			Field Inspector	LAUREN CANDREVA			;			
Pressure transducer											
Type of Pressure Gauge	with data logger	inch face;	300	psi full scale;	0.001	psi increments;					

New Gauge? Yes  No  If no, date of calibration \_\_\_\_\_ Calibration certification submitted? Yes  No

**TEST RESULTS**

Readings must be taken at least every 10 minutes for a minimum of 30 minutes for Class II, III and V wells and 60 minutes for Class I wells.

For Class II wells, annulus pressure should be at least 300 psig. For Class I wells, annulus pressure should be the greater of 300 psig or 100 psi above maximum permitted injection pressure.

Original chart recordings must be submitted with this form.

5-year or annual test on time? Yes  No   
 2-year test for TA'd wells on time? Yes  No   
 After rework? Yes  No   
 Newly permitted well? Yes  No

Time	Pressure (in psig)	
	Annulus	Tubing
9:20	167.98	same
9:30	168.12	same
9:40	168.38	same
9:50	168.78	same

Casing size 4" - NOMINAL  
 Tubing size 2"  
 Packer type INFLATABLE PACKER  
 Packer set @ 4.36(top), 482.56(bottom)  
 Top of Permitted Injection Zone 415 feet  
 Is packer 100 ft or less above top of  
 Injection Zone ? Yes  No   
 If not, please submit a justification.  
 Fluid return (gal.) 0.29

Comments: Two tests were conducted to confirm results, data for both tests included in attached table and chart  
 Max. Allowable Pressure Change: Initial test pressure x 0.05 8.40 psi  
 Test Period Pressure change 0.8 psi

Test Pressures: Max. Allowable Pressure Change: Initial test pressure x 0.05 8.40 psi  
 Test Passed  Test Failed

If failed test, well must be shut in, no injection can occur, and USEPA must be contacted within 24 hours. Corrective action needs to occur, the well retested, and written authorization received before injection can recommence.

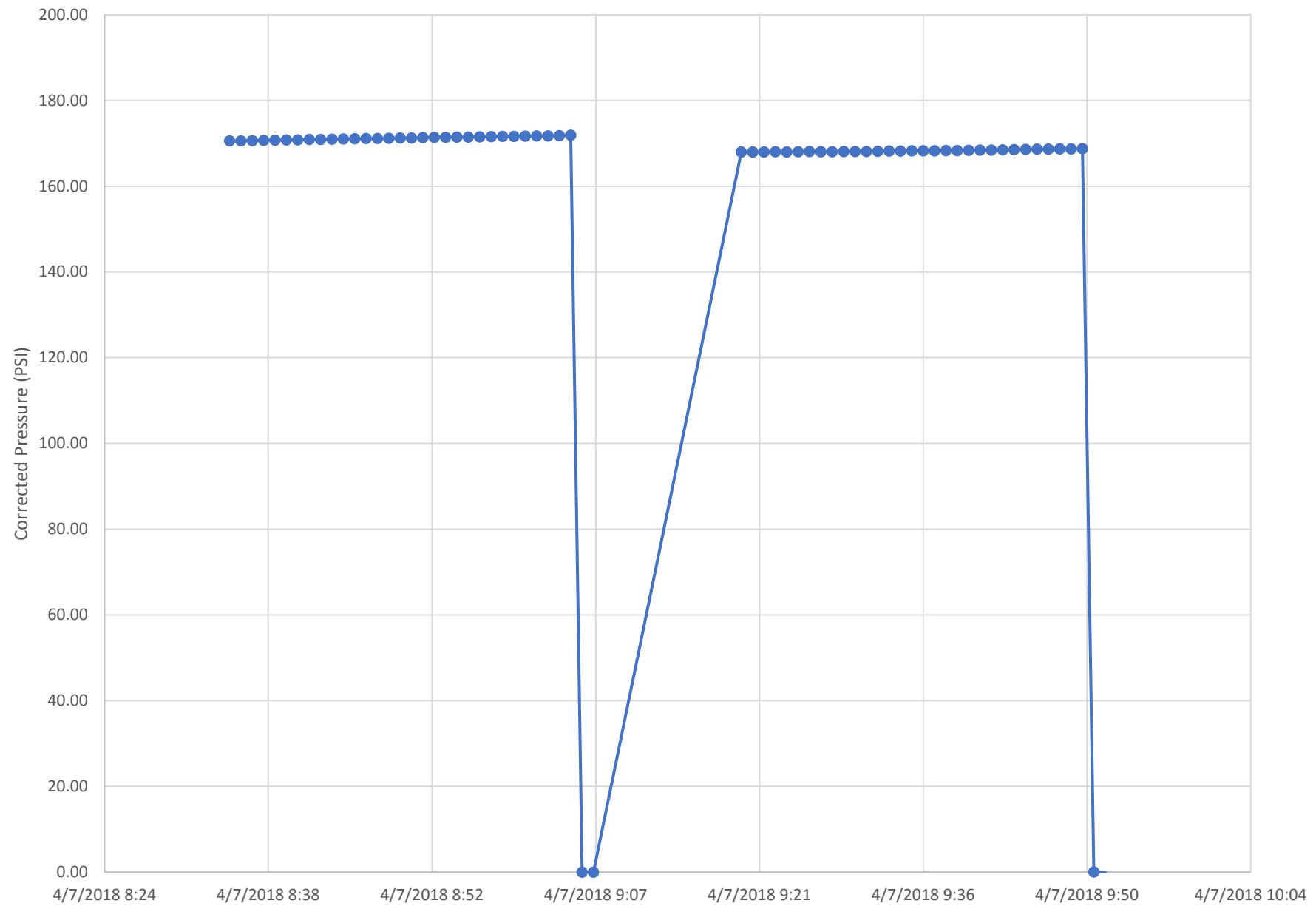
I certify under penalty of law that this document and all attachments are, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (See 40 CFR 144.32(d))

Ian Ream  
 Printed Name of Company Representative

IR  
 Signature of Company Representative

9-14-2018  
 Date

### WB-04 Standard Annular Pressure Test Data



<b>Well WB-04 SAPT Data</b>		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Pressure (PSI) (Sensor pressure - barometric pressure)
4/7/2018 8:35	184.514	170.55
4/7/2018 8:36	184.532	170.57
4/7/2018 8:37	184.599	170.64
4/7/2018 8:38	184.651	170.69
4/7/2018 8:39	184.69	170.73
4/7/2018 8:40	184.775	170.81
4/7/2018 8:41	184.784	170.82
4/7/2018 8:42	184.85	170.89
4/7/2018 8:43	184.894	170.93
4/7/2018 8:44	184.953	170.99
4/7/2018 8:45	184.965	171.00
4/7/2018 8:46	185.036	171.08
4/7/2018 8:47	185.072	171.11
4/7/2018 8:48	185.09	171.13
4/7/2018 8:49	185.142	171.18
4/7/2018 8:50	185.222	171.26
4/7/2018 8:51	185.218	171.26
4/7/2018 8:52	185.297	171.34
4/7/2018 8:53	185.34	171.38
4/7/2018 8:54	185.351	171.39
4/7/2018 8:55	185.397	171.44
4/7/2018 8:56	185.422	171.46
4/7/2018 8:57	185.489	171.53
4/7/2018 8:58	185.516	171.56
4/7/2018 8:59	185.566	171.61
4/7/2018 9:00	185.608	171.65
4/7/2018 9:01	185.665	171.70
4/7/2018 9:02	185.713	171.75
4/7/2018 9:03	185.713	171.75
4/7/2018 9:04	185.77	171.81
4/7/2018 9:05	185.842	171.88
4/7/2018 9:06	13.964	0.00
4/7/2018 9:07	13.961	0.00
4/7/2018 9:20	181.942	167.98
4/7/2018 9:21	181.971	168.01
4/7/2018 9:22	181.936	167.98
4/7/2018 9:23	181.982	168.02
4/7/2018 9:24	181.944	167.98
4/7/2018 9:25	181.985	168.02
4/7/2018 9:26	182.028	168.07

<b>Well WB-04 SAPT Data</b>		
Tranducer Serial Number:	554227	
Tranducer Model:	Level TROLL 400 non-vented 300 psi	
Date and Time	Pressure (PSI)	Corrected Pressure (PSI) (Sensor pressure - barometric pressure)
4/7/2018 9:27	182.014	168.05
4/7/2018 9:28	182.006	168.05
4/7/2018 9:29	182.054	168.09
4/7/2018 9:30	182.077	168.12
4/7/2018 9:31	182.069	168.11
4/7/2018 9:32	182.127	168.17
4/7/2018 9:33	182.142	168.18
4/7/2018 9:34	182.151	168.19
4/7/2018 9:35	182.197	168.24
4/7/2018 9:36	182.219	168.26
4/7/2018 9:37	182.227	168.27
4/7/2018 9:38	182.273	168.31
4/7/2018 9:39	182.294	168.33
4/7/2018 9:40	182.338	168.38
4/7/2018 9:41	182.373	168.41
4/7/2018 9:42	182.407	168.45
4/7/2018 9:43	182.453	168.49
4/7/2018 9:44	182.506	168.55
4/7/2018 9:45	182.543	168.58
4/7/2018 9:46	182.585	168.62
4/7/2018 9:47	182.599	168.64
4/7/2018 9:48	182.67	168.71
4/7/2018 9:49	182.678	168.72
4/7/2018 9:50	182.738	168.78
4/7/2018 9:51	13.992	0.03
4/7/2018 9:52	13.941	-0.02

**APPENDIX H**

**Well Development Field Forms**

## DEVELOPMENT FIELD DATA LOG

Project Name: <u>PC1</u>	Project No.:
Well No.: <u>WB-04</u>	Date: <u>4/1/18</u>
Location:	Measuring Point:
Total Depth of Well (ft bbls):	Screen Interval (ft bbls):
Pump Type/Setting (ft bbls):	Activity: <u>air lift</u>
How Q Measured: <u>Sight bucket</u>	H&A Personnel: <u>PC16F</u>

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. (µhos/cm)	Temp. °C	Turbidity NTU	Comments
0735	~12			0	8.30	1854	21.6	OR	
1039	~12			0	8.33	1803	24.5	457	
1110	~12			0	8.29	1293	24.4	31.1	
1131	~12			0	8.33	1800	23.7	31.0	
1202	~12			0	8.34	1800	24.0	12.1	
1240	~11			0	8.31	1799	25.5	16.3	
1309	~12			0	8.31	1799	25.5	13.3	
1329	~12			0	8.33	1795	22.5	11.5	
1402	~12			0	8.33	1798	25.4	17.0	
1430	~12			0	8.29	1796	25.3	15.4	
1511	<i>Stop all joints</i>								
1530	<i>Resume at 14ft</i>								
1548	~10			0	8.29	1785	25.4	OR	
1615	~10			0	8.30	1790	25.4	31.3	
1635	~10			0	8.27	1291	25.1	151	
1657	~10			0	8.25	1787	24.5	121	
1713	~10			0	8.27	1783	24.4	103	
1740	~10			0	8.29	1786	24.3	32.1	
1840	~10			0	8.26	1783	24.5	132	
2040	~8			1	8.10	1631	24.62	92.5	
2130	~8			0	8.1	1655	21.16	154	
2140	~8			0	8.11	1655	21.52	825	
2230	~8			TR	8.05	1624	20.00	ODR	
2310	~8			0.7	8.05	1614	20.05	182	
2300	~8			0	8.10	1645	21.03	67.6	
0034	~8			1	8.14	1623	21.09	ODR	
0813	~10			0	8.22	1556	21.5	528	
0935	~10			0	8.33	1785	23.5	OR	

*927'*

*4/2/18*

Comments:

## **DEVELOPMENT FIELD DATA LOG**

Project Name:	Project No.:
Well No.: <i>WB-061</i>	Date: <i>4/2/18</i>
Location:	Measuring Point:
Total Depth of Well (ft bbls):	Screen Interval (ft bbls):
Pump Type/Setting (ft bbls):	Activity:
How Q Measured: <i>Soil bucket</i>	H&A Personnel: <i>PK</i>

**Comments:**

**DEVELOPMENT  
FIELD DATA LOG**

Project Name: <u>FCI</u>	Project No.: <u>129691-001</u>
Well No.: <u>INB-CA</u>	Date: <u>4-3-18 - 4/4</u>
Location: <u>Florence, AZ</u>	Measuring Point: <u>PVC SOUNDS TUBE 1.95' ALS</u>
Total Depth of Well (ft bbls): <u>1200.175</u>	Screen Interval (ft bbls):
Pump Type/Setting (ft bbls): <u>100, 800</u>	Activity: <u>Drap - DEVELOPMENT</u>
How Q Measured: <u>FLOW METER + STOPWATCH</u>	H&A Personnel: <u>E.K.</u>

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. ( $\mu\text{mhos/cm}$ )	Temp. °C	Turbidity NTU	Comments
2003		228.85	JWL						FLOW METER, gpm
2123	12	247.5		0	8.16	17469	22.88	00R	1580230
2145	19	247.9		0	8.24	9274	23.17	197	1580475
2204	14	248.2		0	8.12	7149	22.60	73.6	1580733
2227	14	248.2		0	8.21	9071	22.58	32.5	1581135
2300	13	248.3		0	8.04	4288	23.20	29.8	1581470
2330	13	248.4		0	8.00	3523	23.16	14.9	1581860
0000	14	248.5		0	9.00	3108	22.21	17.6	1582260
0030	14	248.6		0	7.87	2812	22.63	10.8	1582655
0116	14	248.7		0	7.97	2822	22.46	9.32	1583240
0130	14	248.7		0	7.92	2481	23.02	10.3	1583449
0202	14	248.8		0	7.88	2342	22.73	19.4	1583860
0232	14	248.8		0	7.46	2221	22.35	19.0	1584265
0320	14	248.8		0	7.78	2104	22.35	5.90	1584960
0403	14	246.5		0	7.93	2272	22.28	79.80	1585100 surge
0503	14	246.6		0	7.81	2120	23.21	160	1585435
0550	14	246.8		0	7.87	2088	22.56	168	1585600
0606	19	246.9		0	7.89	2159	23.8	44.5	1585790
0630	14	245.9		0	7.89	2120	23.6	16.1	1586100
0652	14	246.2		0	7.87	2080	24.0	7.24	1586380
0723	14	245.9		0	7.91	2058	23.9	2.25	1586470
0736	14	245.7		0	7.94	2104	24.3	19.7	1586600
0750	14	245.9		0	7.89	2042	24.3	04.6	1586780
0809	14	246.2		0	7.84	2033	24.4	14.5	1587070
0820	14	246.4		0	7.87	1988	24.9	9.32	1587320
0843	14	246.4		0	7.83	2005	24.9	6.89	1587460
0859	14	246.4		0	7.81	1926	25.0	0.55	1587680
0911	14	246.4		0	7.83	1960	24.9	5.00	1587920

Comments: Static = 228.85

**DEVELOPMENT  
FIELD DATA LOG**

Project Name: <u>FCI</u>	Project No.: <u>129687-007</u>
Well No.: <u>WB-04</u>	Date: <u>4/4/12</u>
Location:	Measuring Point: <u>PVC sanding tube</u>
Total Depth of Well (ft bbls): <u>1175</u>	Screen Interval (ft bbls):
Pump Type/Setting (ft bbls): <u>1100, 800, 550</u>	Activity: <u>pump development</u>
How Q Measured: <u>Flow meter + stopwatch</u>	H&A Personnel: <u>PK</u>

Time	Discharge (gpm)	Pumping Water Level (ft)	Specific Capacity (gpm/ft)	Sand Content (ppm)	pH	Sp. Cond. (μmhos/cm)	Temp. °C	Turbidity NTU	Comments
0933	14	246.5		0	7.81	1969	25.1	3.77	1588130
0944	14	246.5		0	7.81	1948	25.2	3.22	1588310
1003	14	246.5		0	7.81	1946	25.3	3.03	1588520
1019	14	246.6		0	7.80	1947	25.2	2.87	1588710
1032	14	246.6		0	7.80	1939	25.3	2.44	1588900
1051	14	246.6		0	7.80	1923	25.5	3.02	1589210
1122	14	245.7		0	7.82	1925	24.6	2.76	1589320
1141	14	245.7		0	7.85	1921	25.5	12.0	1589570
1152	14	246.0		0	7.80	1919	25.5	18.4	1589710
1232	14	246.5		0	7.83	1912	25.7	61.4	1590150
1304	14	246.2		0	7.84	1899	25.8	67.11	1590590
1321	14	246.7		0	7.86	1888	25.7	57.5	1590770
1337	14	246.8		0	7.92	1895	25.5	40.3	1590980
1631	14	237.8		0	8.07	2133	29.8	48.6	1591440
1696	14	238.0		0	7.79	1947	29.8	42.0	1591600
1701	14	238.0		0	7.80	1943	29.8	31.0	1591890
1717	14	238.2		0	7.81	1937	29.7	20.6	1592010
1732	14	238.2		0	7.84	1926	25.0	25.4	1592210
1747	14	238.2		0	7.83	1928	25.2	23.4	1592410
1820	14	238.4		0	7.75	1861	24.66	14.2	1592880
1850	14	238.6		0	7.69	1831	23.94	13.2	1593300
1930	14	238.7		0	7.66	1814	24.10	9.06	1593340
2045	14	239.1		0	7.67	1789	23.30	1.309	1594855
2137	14	240.3		0	7.70	1714	22.85	7.38	1595100
2220	14	240.5		0	7.76	1747	22.90	14.2	1595300
2210	14	238.2		0	7.74	1734	22.89	26.9	1595525
0005	14	337.4		0	7.80	1774	22.91	53.0	1597100
0040	14	238.0		0	7.73	1739	22.10	26.4	1596000

Comments:

WB-OF

Page 5 of 5

# DEVELOPMENT FIELD DATA LOG

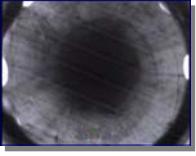
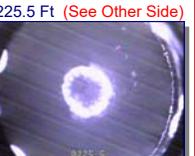
Project Name: FCI PTF	Project No.: 129687
Well No.: R-02 INR-04	Date: 3-23-18 through 4/3/18
Location: Florence, AZ	Measuring Point:
Total Depth of Well (ft bbls): 1200	Screen Interval (ft bbls): 1200-900, 880-660, 640-520
Pump Type/Setting (ft bbls): 500' SUBMERSIBLE	Activity: Air Lift Test Pumping
How Q Measured: Stopwatch	H&A Personnel: C Price, T G FOUSHIER

**APPENDIX I**

**Well Video Log and Gyroscopic Survey Reports**

Client: **Florence Copper** Survey Date: **April 06, 2018**  
 Address: \_\_\_\_\_ Invoice: \_\_\_\_\_ Run: **1**  
 City: \_\_\_\_\_ Country: \_\_\_\_\_ Well Name: **WB-04**  
 Requested By: **Haley and Aldrich** P.O.: \_\_\_\_\_ Well Owner: \_\_\_\_\_  
 Copy To: \_\_\_\_\_ Camera: \_\_\_\_\_  
 Purpose: **General Inspection** Zero Datum: **Top of Casing**  
 Location: \_\_\_\_\_ Depth: **1200 ft.** Vehicle: **750**  
 Field: **Florence Copper**

1st Csg.O.D. **4 In.** Csg Weight: \_\_\_\_\_ From: **0 ft.** To: **500 ft.** 2nd Csg.O.D. **4 In.** Csg Weight: \_\_\_\_\_ From: **500 ft.** To: **1174.4 ft.**  
 Standing Water Level: \_\_\_\_\_ Pumping Water Level: \_\_\_\_\_ Pump Depth: \_\_\_\_\_ O.D.Ref.: **Measured** Casing Buildup: **None**  
 Operator: **E. Turner** Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Sec: \_\_\_\_\_ Twp: \_\_\_\_\_ Rge: \_\_\_\_\_

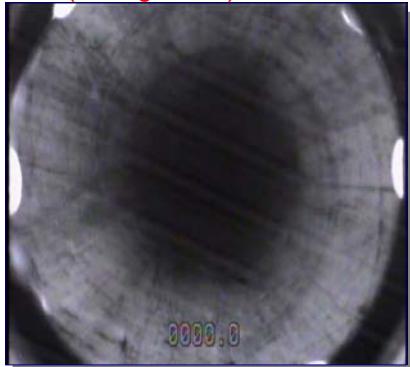
Other Information:		True Depths: (SideScan-Feet)	WELLBORE / CASING INFORMATION
0 Ft (See Other Side)	38 Ft (See Other Side)	0	Zero Point - Top of Casing
		38	Side scan of joint in FG
		109.1	Downhole view of FG casing
		153.2	Side scan of joint in FG
109.1 Ft (See Other Side)	153.2 Ft (See Other Side)	202.5	Downhole view of casing - in good condition
		225.5	Downhole view of Static Water Level
		225.7	Side scan of Static Water Level
202.5 Ft (See Other Side)	225.5 Ft (See Other Side)	299.7	Downhole view - poor visibility
		503	Downhole view in PVC - moderate visibility
		530.2	Downhole view in PVC - poor visibility
		543.7	Downhole view in blank PVC with joint
225.7 Ft (See Other Side)	299.7 Ft (See Other Side)	563.6	Downhole view in blank PVC with joint - Top Perf 1
			
503 Ft (See Other Side)	530.2 Ft (See Other Side)		
			
543.7 Ft (See Other Side)	563.6 Ft (See Other Side)		
			

Notes:

Page Number: 1

## 12 WELLBORE SHAPSHOTS

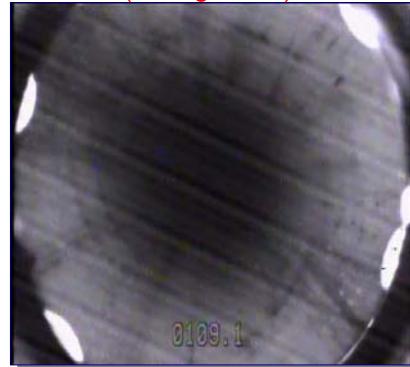
0 Ft (Enlargement)



38 Ft (Enlargement)



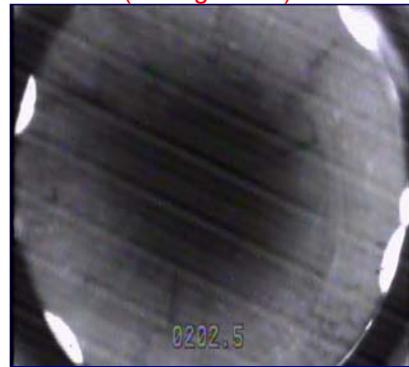
109.1 Ft (Enlargement)



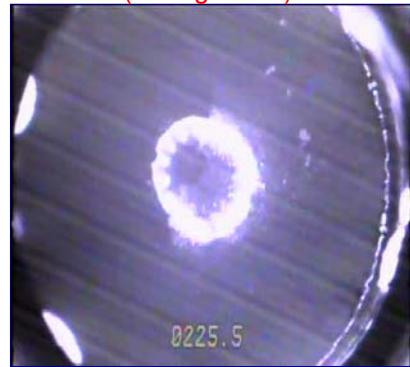
153.2 Ft (Enlargement)



202.5 Ft (Enlargement)



225.5 Ft (Enlargement)



225.7 Ft (Enlargement)



299.7 Ft (Enlargement)



503 Ft (Enlargement)



530.2 Ft (Enlargement)



543.7 Ft (Enlargement)

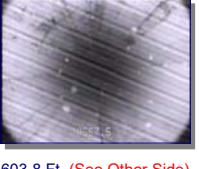
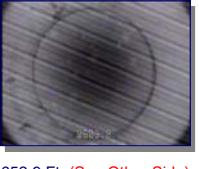
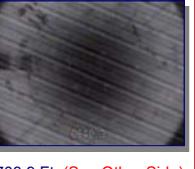
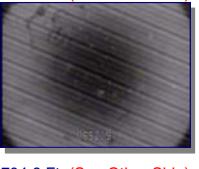
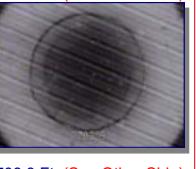
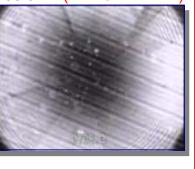
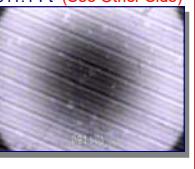


563.6 Ft (Enlargement)



Client: Florence Copper Survey Date: April 06, 2018  
 Address: \_\_\_\_\_ Invoice: \_\_\_\_\_ Run: 1  
 City: \_\_\_\_\_ Country: \_\_\_\_\_ Well Name: WB-04  
 Requested By: Haley and Aldrich P.O.: \_\_\_\_\_ Well Owner: \_\_\_\_\_  
 Copy To: \_\_\_\_\_ Camera: \_\_\_\_\_  
 Purpose: General Inspection Zero Datum: Top of Casing  
 Location: \_\_\_\_\_ Depth: 1200 ft. Vehicle: 750  
 Field: Florence Copper

1st Csg.O.D. 4 In. Csg Weight: \_\_\_\_\_ From: 0 ft. To: 500 ft. 2nd Csg.O.D. 4 In. Csg Weight: \_\_\_\_\_ From: 500 ft. To: 1174.4 ft.  
 Standing Water Level: \_\_\_\_\_ Pumping Water Level: \_\_\_\_\_ Pump Depth: \_\_\_\_\_ O.D.Ref.: Measured Casing Buildup: None  
 Operator: E. Turner Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Sec: \_\_\_\_\_ Twp: \_\_\_\_\_ Rge: \_\_\_\_\_

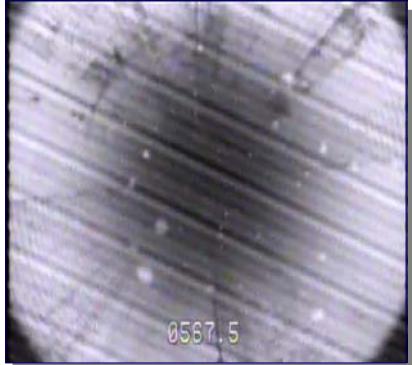
Other Information: <b>Wellbore Snapshots</b>	True Depths: (SideScan-Feet)	<b>WELLBORE / CASING INFORMATION</b>
567.5 Ft (See Other Side) 	567.5	Downhole view in perfs - good condition with minor build up
583.8 Ft (See Other Side) 	583.8	Downhole view of joint - Bottom Perf 1
603.8 Ft (See Other Side) 	603.8	Downhole view in blank PVC with casing joint
640.3 Ft (See Other Side) 	640.3	Downhole view of PVC casing - minor buildup on casing walls
652.9 Ft (See Other Side) 	652.9	Same as above
703.9 Ft (See Other Side) 	703.9	Downhole view of casing joint
704.8 Ft (See Other Side) 	704.8	Top of Perf 2 - side scan
708.3 Ft (See Other Side) 	708.3	Downhole view of perfs - good condition, open with minor buildup
714.2 Ft (See Other Side) 	714.2	Bottom Perf 2
811.1 Ft (See Other Side) 	811.1	Downhole view in blank PVC
842 Ft (See Other Side) 	842	Side scan of PVC
844.3 Ft (See Other Side) 	844.3	Downhole view of casing joint where Perf 3 begins

Notes:

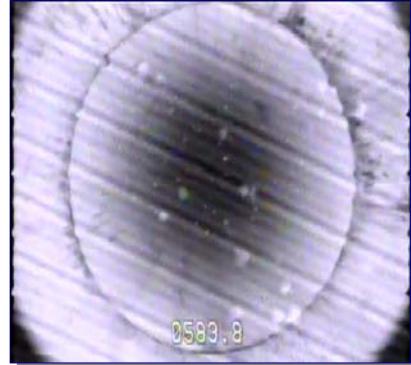
**Page Number: 3**

## 12 WELLBORE SHAPSHOTS

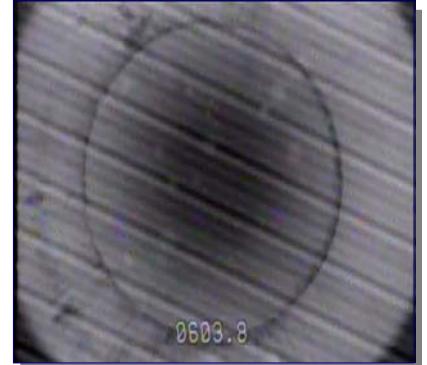
567.5 Ft (Enlargement)



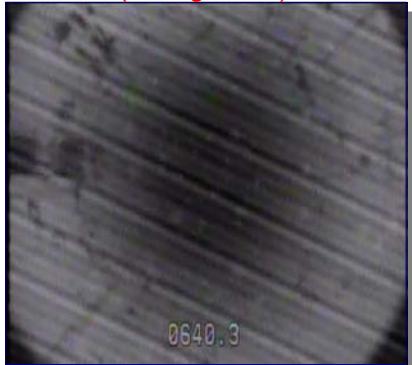
583.8 Ft (Enlargement)



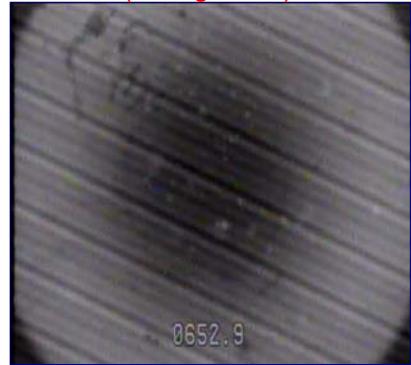
603.8 Ft (Enlargement)



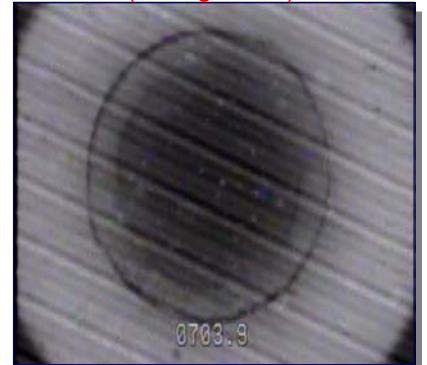
640.3 Ft (Enlargement)



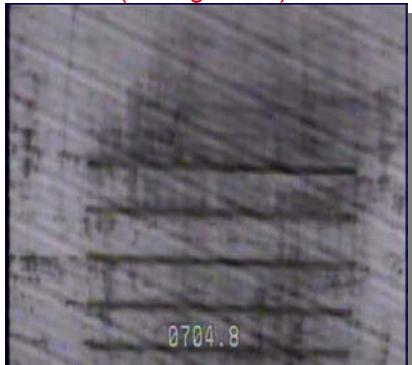
652.9 Ft (Enlargement)



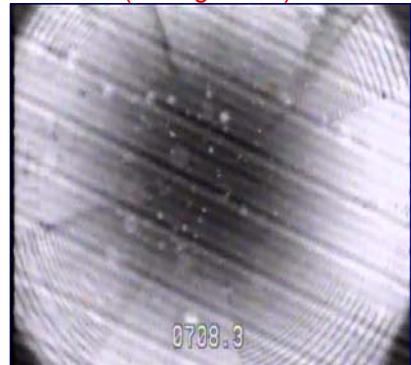
703.9 Ft (Enlargement)



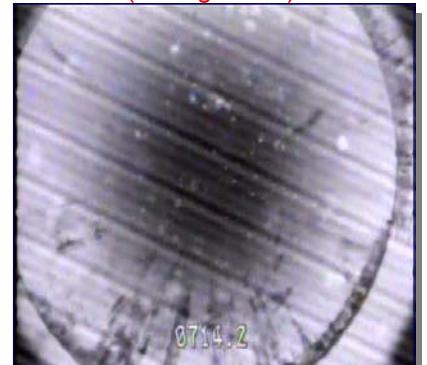
704.8 Ft (Enlargement)



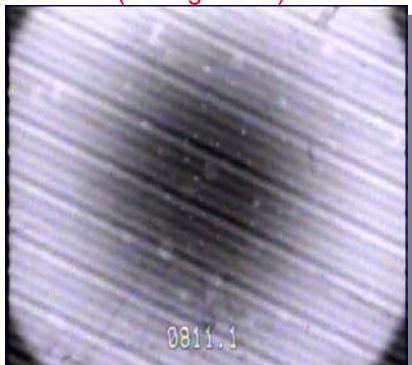
708.3 Ft (Enlargement)



714.2 Ft (Enlargement)



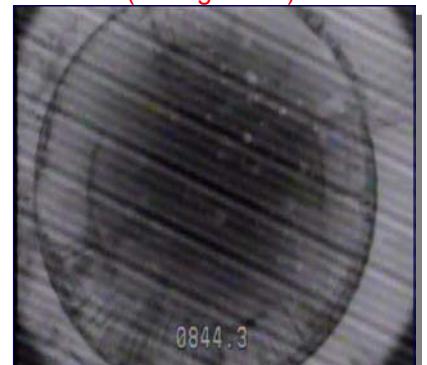
811.1 Ft (Enlargement)



842 Ft (Enlargement)

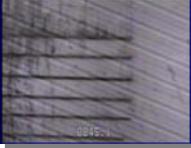
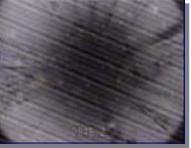
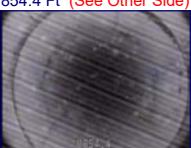
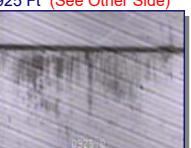
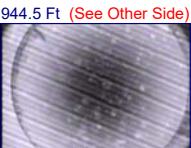
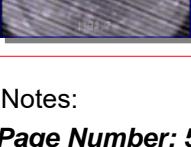
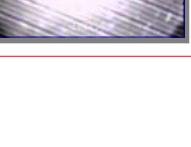


844.3 Ft (Enlargement)



Client: Florence Copper Survey Date: April 06, 2018  
 Address: \_\_\_\_\_ Invoice: \_\_\_\_\_ Run: 1  
 City: \_\_\_\_\_ Country: \_\_\_\_\_ Well Name: WB-04  
 Requested By: Haley and Aldrich P.O.: \_\_\_\_\_ Well Owner: \_\_\_\_\_  
 Copy To: \_\_\_\_\_ Camera: \_\_\_\_\_  
 Purpose: General Inspection Zero Datum: Top of Casing  
 Location: \_\_\_\_\_ Depth: 1200 ft. Vehicle: 750  
 Field: Florence Copper

1st Csg.O.D. 4 In. Csg Weight: \_\_\_\_\_ From: 0 ft. To: 500 ft. 2nd Csg.O.D. 4 In. Csg Weight: \_\_\_\_\_ From: 500 ft. To: 1174.4 ft.  
 Standing Water Level: \_\_\_\_\_ Pumping Water Level: \_\_\_\_\_ Pump Depth: \_\_\_\_\_ O.D.Ref.: Measured Casing Buildup: None  
 Operator: E. Turner Lat.: \_\_\_\_\_ Long.: \_\_\_\_\_ Sec: \_\_\_\_\_ Twp: \_\_\_\_\_ Rge: \_\_\_\_\_

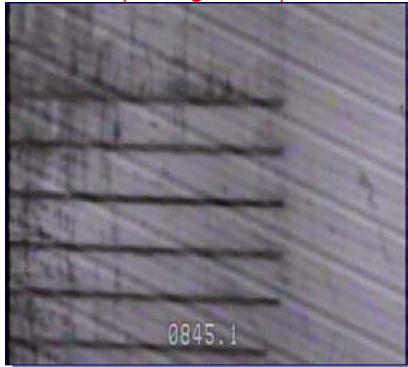
Other Information: <b>Wellbore Snapshots</b>	True Depths: (SideScan-Feet)	<b>WELLBORE / CASING INFORMATION</b>
845.1 Ft (See Other Side) 	845.1	Top of Perf 3 - Side scan
846.2 Ft (See Other Side) 	846.2	Downhole view of perfs - good condition
854.4 Ft (See Other Side) 	854.4	Downhole view of casing joint - bottom of Perf 3
925 Ft (See Other Side) 	925	Side scan of casing joint
944.5 Ft (See Other Side) 	944.5	Downhole view of blank PVC and casing joint
985.3 Ft (See Other Side) 	985.3	Top of Perf 4 - Side Scan
994.5 Ft (See Other Side) 	994.5	Downhole view of casing joint - bottom of Perf 4
1,105.2 Ft (See Other Side) 	1,105.2	Side scan of casing joint
1,125.4 Ft (See Other Side) 	1,125.4	Top Perf 5 - side scan
1,134.7 Ft (See Other Side) 	1,134.7	Downhole view - visibility becoming progressively worse with depth
1,174.4 Ft (See Other Side) 	1,174.4	TD
1105.2 Ft (See Other Side) 	1105.2	
1125.4 Ft (See Other Side) 	1125.4	
1134.7 Ft (See Other Side) 	1134.7	
1174.4 Ft (See Other Side) 	1174.4	

Notes:

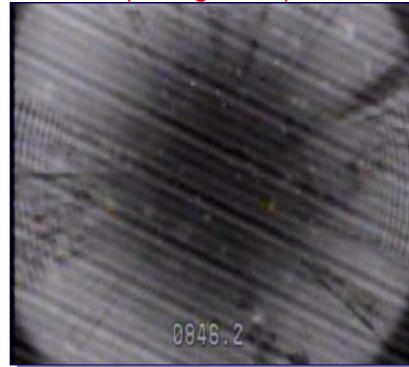
Page Number: 5

## 12 WELLBORE SHAPSHOTS

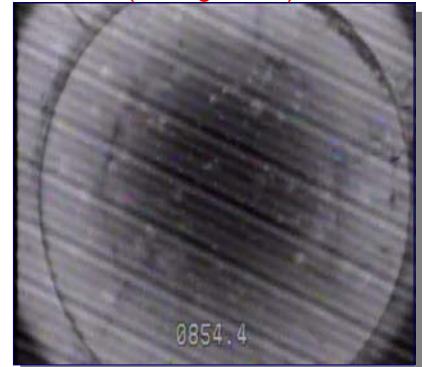
845.1 Ft (Enlargement)



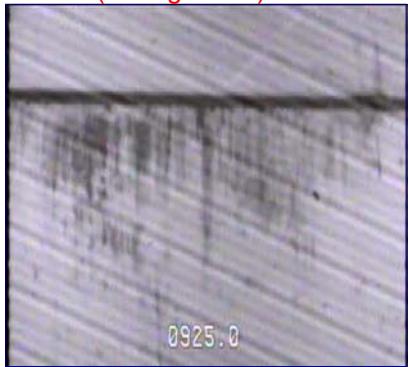
846.2 Ft (Enlargement)



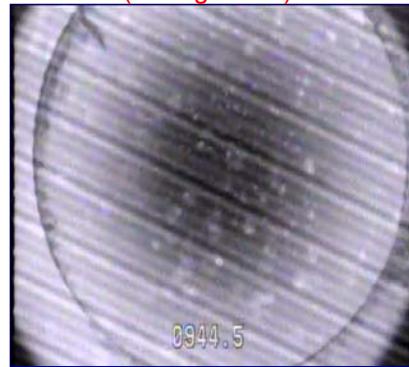
854.4 Ft (Enlargement)



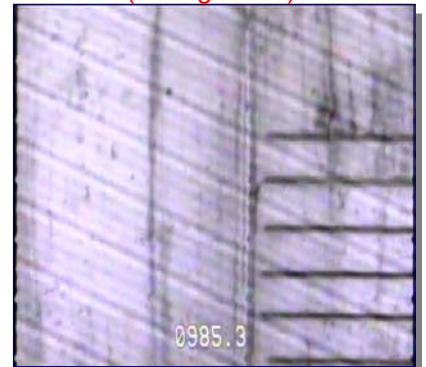
925 Ft (Enlargement)



944.5 Ft (Enlargement)



985.3 Ft (Enlargement)



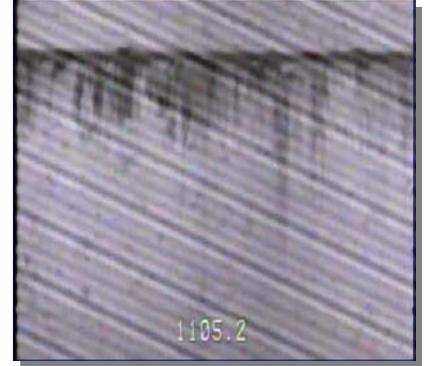
989.4 Ft (Enlargement)



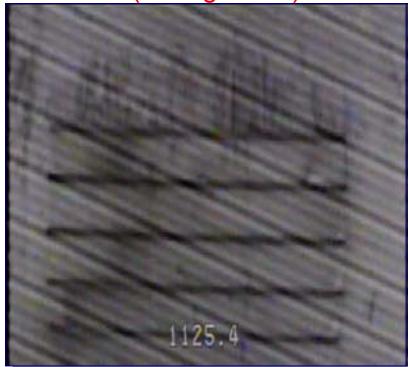
994.5 Ft (Enlargement)



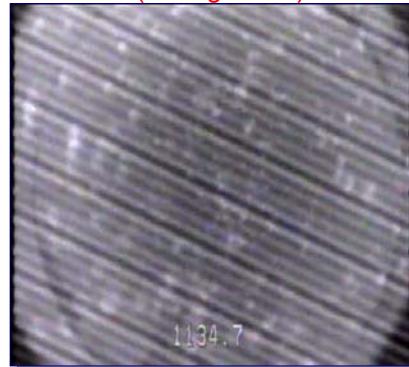
1105.2 Ft (Enlargement)



1125.4 Ft (Enlargement)



1134.7 Ft (Enlargement)



1174.4 Ft (Enlargement)



# *Drift Report*

## Wellbore DRIFT Interpretation

**PREPARED ESPECIALLY FOR  
Florence Copper and Florence Copper  
WB-04**

**Friday - April 6, 2018**

This Wellbore Interpretation Package represents our best efforts to provide a correct interpretation. Nevertheless, since all interpretations are opinions based on inferences from electrical or other types of measurements, we cannot and do not guarantee the accuracy or correctness of any interpretation, and we shall not be liable or responsible for any loss, costs, damages, or expenses incurred or sustained by Customer resulting from any interpretation made by this document. We do not warrant or guarantee the accuracy of the data, specifically including (but without limitations) the accuracy of data transmitted by electronic process, and we will not be responsible for accidental or intentional interception of such data by third parties. Our employees are not empowered to change or otherwise modify the attached interpretation. Furthermore, along with Eagle Pro Software we do not warrant or guarantee the accuracy of the programming techniques employed to produce this document. By accepting this Interpretation Package, the Customer agrees to the foregoing, and to our General Terms and Conditions.



**Southwest Exploration Services, LLC  
(480) 926-4558**

# WELLBORE DRIFT INTERPRETATION

## Southwest Exploration Services, LLC

(480) 926-4558

Company:	Florence Copper		Well Owner:	Florence Copper	
County:	Pinal	State:	Arizona	Country:	United States
Well Number:	WB-04	Survey Date:	Friday - April 6, 2018	Magnetic Declination:	Declination Correction Not Used
Field:	Florence Copper Project		Drift Calculation Methodology:	Balanced Tangential Method	
Location:					
Remarks:					
Witness:	H&A	Vehicle No.:	500	Invoice No.:	Operator: E. BEAM
Tool:	Gyro - 1422		Lat.:	Long.:	Sec.: Twp.: Rge.:

MEASURED DATA			DATA COMPUTATIONS						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BGR., degrees
0	0.49	234.98	0.00						
20	0.60	230.36	19.99	-0.116	-0.151	1.00	0.12	0.19' (2.28")	232.40
40	0.25	195.10	39.98	-0.225	-0.243	0.41	0.89	0.33' (3.96")	227.20
60	0.31	186.85	59.97	-0.321	-0.261	0.96	0.21	0.41' (4.92")	219.10
80	0.38	232.97	79.96	-0.415	-0.320	0.84	1.15	0.52' (6.24")	217.70
100	0.30	254.30	99.96	-0.469	-0.423	0.42	0.54	0.63' (7.56")	222.10
120	0.29	244.67	119.95	-0.505	-0.519	0.13	0.25	0.72' (8.64")	225.80
140	0.29	235.62	139.94	-0.555	-0.607	0.43	0.23	0.82' (9.84")	227.50
160	0.29	173.86	159.93	-0.634	-0.643	0.83	1.51	0.90' (10.80")	225.40
180	0.26	172.09	179.92	-0.729	-0.631	0.95	0.05	0.96' (11.52")	220.90
200	0.35	175.80	199.91	-0.835	-0.620	0.37	0.10	1.04' (12.48")	216.60
220	0.54	187.79	219.90	-0.989	-0.628	1.00	0.31	1.17' (14.04")	212.40
240	0.32	200.27	239.89	-1.135	-0.660	1.00	0.32	1.31' (15.72")	210.20
260	0.36	187.44	259.88	-1.250	-0.687	0.34	0.33	1.43' (17.16")	208.80
280	0.22	209.31	279.87	-1.346	-0.714	0.93	0.56	1.52' (18.24")	207.90
300	0.26	233.97	299.86	-1.406	-0.769	0.78	0.63	1.60' (19.20")	208.70
320	0.04	126.10	319.85	-1.437	-0.800	0.53	2.38	1.64' (19.68")	209.10
340	0.18	142.26	339.84	-1.466	-0.775	0.00	0.41	1.66' (19.92")	207.90

Page No. 1      True Vertical Depth: **1174.67'**      Final Drift Distance: **3.73'** (44.76")      Final Drift Bearing: **92.90°**

Note: Magnetic Declination is not used because it is not a factor in the calculation of well drift or alignment. Magnetic Declination is only important if attempting to hit a target or miss another well and then it is included in the calculations.

# WELLBORE DRIFT INTERPRETATION

## Southwest Exploration Services, LLC

(480) 926-4558

WB-04

MEASURED DATA			DATA COMPUTATIONS						
DEPTHs, feet	INCLINATIONS, degrees	AZIMUTHs, degrees	TVD, feet	T. LATITUDE, feet	T. LONGITUDE, feet	DOGLEg SEV., degrees per 20 Feet	DOGLEg SEV., degrees per 100 feet	DRIFT DIST., feet	DRIFT BRG., degrees
360	0.31°	285.38°	359.83	-1.476	-0.808	0.56	2.79	1.68' (20.16")	208.70
380	0.16°	153.47°	379.82	-1.487	-0.848	0.73	2.68	1.71' (20.52")	209.70
400	0.16°	201.74°	399.81	-1.538	-0.846	0.88	1.20	1.76' (21.12")	208.80
420	0.07°	060.24°	419.80	-1.558	-0.846	0.20	2.78	1.77' (21.24")	208.50
440	0.12°	105.59°	439.79	-1.558	-0.815	0.97	1.13	1.76' (21.12")	207.60
460	0.19°	165.04°	459.78	-1.596	-0.786	0.96	1.46	1.78' (21.36")	206.20
480	0.17°	242.59°	479.77	-1.642	-0.804	0.12	1.84	1.83' (21.96")	206.10
500	0.21°	006.12°	499.76	-1.619	-0.826	0.81	2.59	1.82' (21.84")	207.00
520	0.11°	064.20°	519.75	-1.574	-0.805	0.59	1.43	1.77' (21.24")	207.10
540	0.10°	066.61°	539.74	-1.559	-0.772	0.73	0.06	1.74' (20.88")	206.30
560	0.01°	138.39°	559.73	-1.553	-0.755	0.28	1.72	1.73' (20.76")	205.90
580	0.12°	046.34°	579.72	-1.540	-0.739	0.77	2.12	1.71' (20.52")	205.60
600	0.22°	050.53°	599.71	-1.501	-0.694	0.49	0.11	1.65' (19.80")	204.80
620	0.21°	092.01°	619.70	-1.478	-0.628	0.69	1.04	1.61' (19.32")	203.00
640	0.24°	058.17°	639.69	-1.457	-0.556	0.13	0.86	1.56' (18.72")	200.90
660	0.25°	049.80°	659.68	-1.407	-0.487	0.83	0.21	1.49' (17.88")	199.10
680	0.37°	052.20°	679.67	-1.339	-0.403	0.80	0.06	1.40' (16.80")	196.70
700	0.30°	071.72°	699.66	-1.283	-0.302	0.25	0.50	1.32' (15.84")	193.30
720	0.21°	100.29°	719.65	-1.273	-0.216	0.54	0.73	1.29' (15.48")	189.60
740	0.23°	098.39°	739.64	-1.285	-0.140	0.24	0.05	1.29' (15.48")	186.20
760	0.34°	103.45°	759.63	-1.305	-0.043	0.94	0.13	1.31' (15.72")	181.90
780	0.34°	082.41°	779.62	-1.311	0.074	0.65	0.54	1.31' (15.72")	176.80
800	0.49°	067.44°	799.61	-1.270	0.212	0.97	0.38	1.29' (15.48")	170.50
820	0.59°	076.72°	819.60	-1.214	0.391	0.06	0.24	1.28' (15.36")	162.10
840	0.56°	088.11°	839.59	-1.187	0.589	0.29	0.29	1.33' (15.96")	153.60
860	0.54°	085.43°	859.58	-1.176	0.781	0.57	0.07	1.41' (16.92")	146.40
880	0.61°	070.34°	879.57	-1.133	0.975	0.47	0.39	1.49' (17.88")	139.30
900	0.55°	086.98°	899.56	-1.092	1.171	0.42	0.43	1.60' (19.20")	133.00
920	0.53°	077.26°	919.55	-1.067	1.357	0.69	0.25	1.73' (20.76")	128.20
940	0.61°	078.62°	939.54	-1.026	1.552	0.04	0.03	1.86' (22.32")	123.50
960	0.58°	088.08°	959.53	-1.002	1.758	0.30	0.24	2.02' (24.24")	119.70
980	0.59°	072.64°	979.52	-0.968	1.957	0.98	0.39	2.18' (26.16")	116.30
1,000	0.78°	067.72°	999.52	-0.886	2.181	0.95	0.13	2.35' (28.20")	112.10

# **WELLBORE DRIFT INTERPRETATION**

Southwest Exploration Services, LLC  
(480) 926-4558

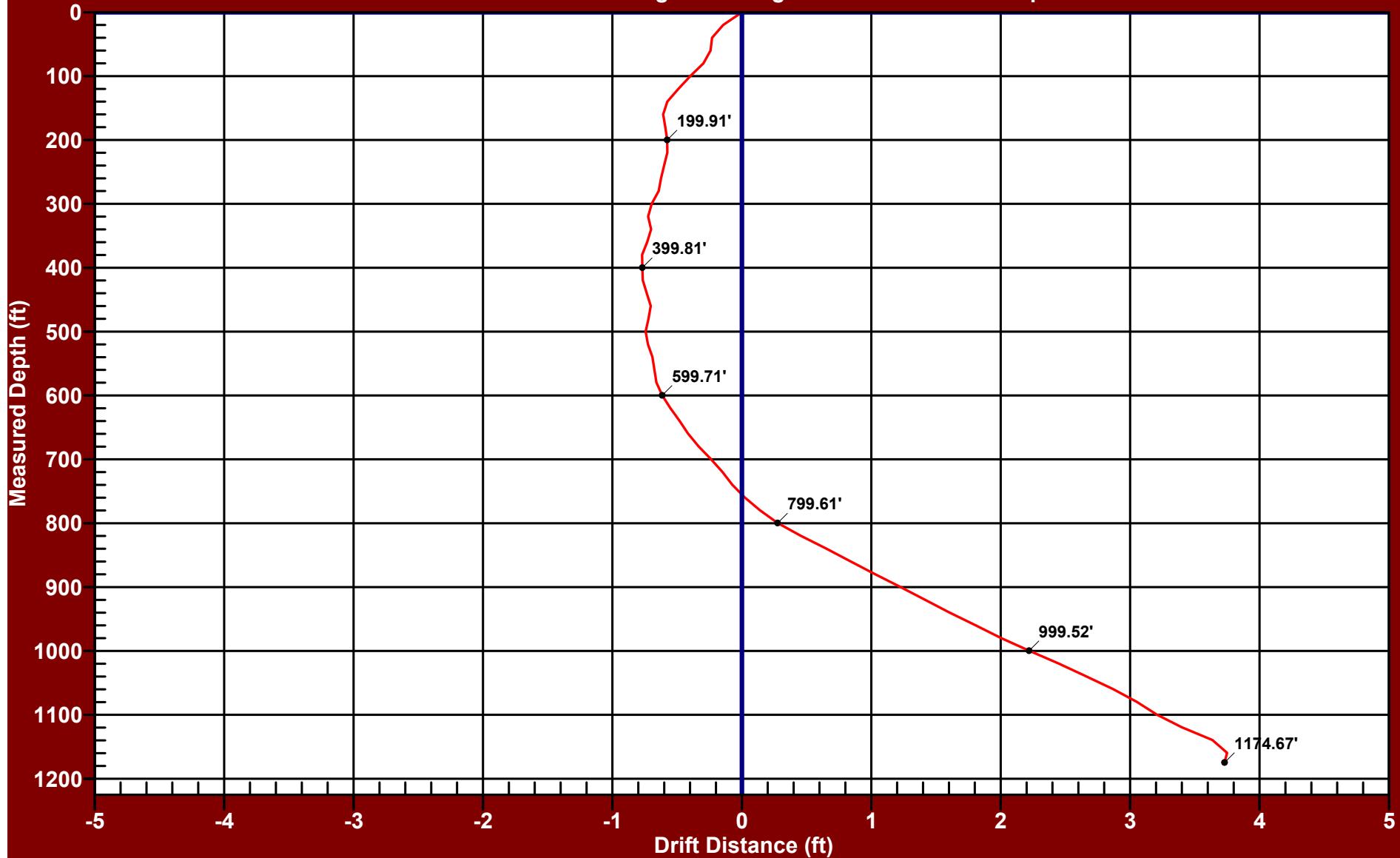
WB-04

# PLANE OF DRIFT VIEW - WB-04

Florence Copper

Florence Copper

Drift Distance = 3.73 Feet      Drift Bearing = 92.9 Degrees      True Vertical Depth = 1174.67 Feet



Date of Survey: Friday - April 6, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# 3D PROJECTION VIEW - WB-04

Florence Copper

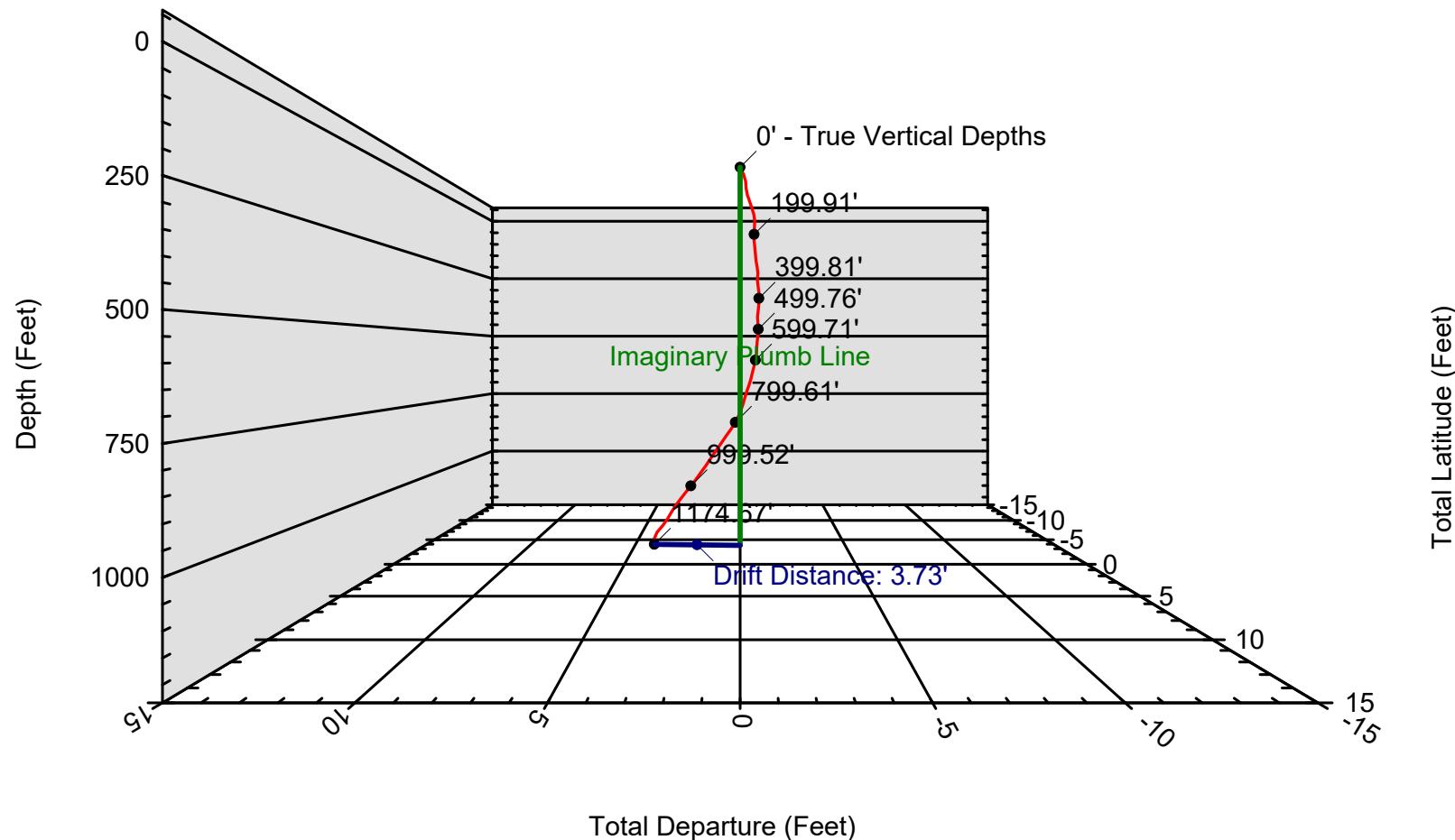
Florence Copper

Drift Distance = 3.73 Feet

Drift Bearing = 92.9 Degrees

True Vertical Depth = 1174.67 Feet

0.0



Date of Survey: Friday - April 6, 2018

Balanced Tangential Calculation Method

Southwest Exploration Services, LLC (480) 926-4558

# POLAR VIEW - WB-04

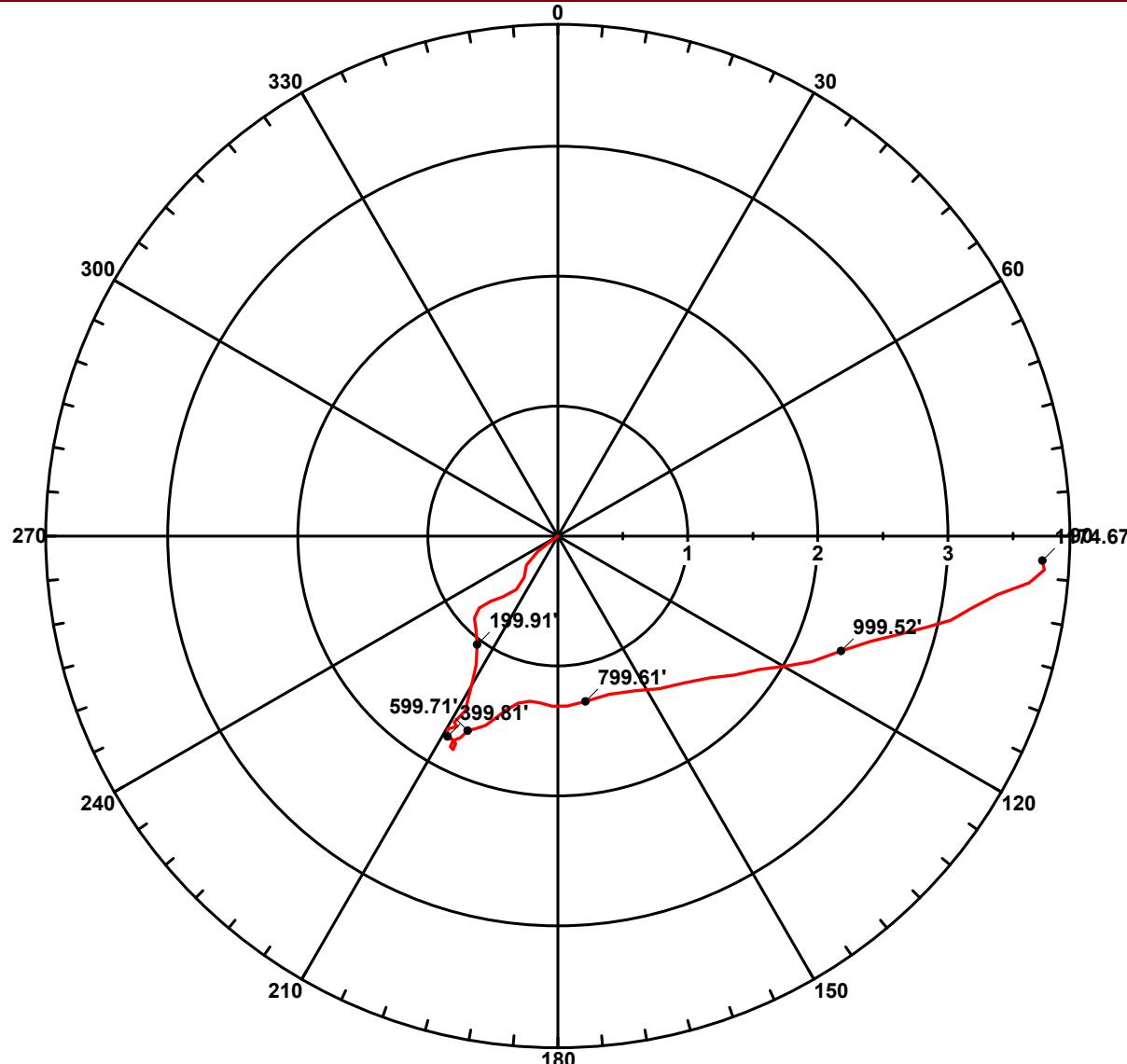
Florence Copper

Florence Copper

Drift Distance = 3.73 Feet

Drift Bearing = 92.9 Degrees

True Vertical Depth = 1174.67 Feet



Date of Survey: Friday - April 6, 2018

Balanced Tangential Calculation Method

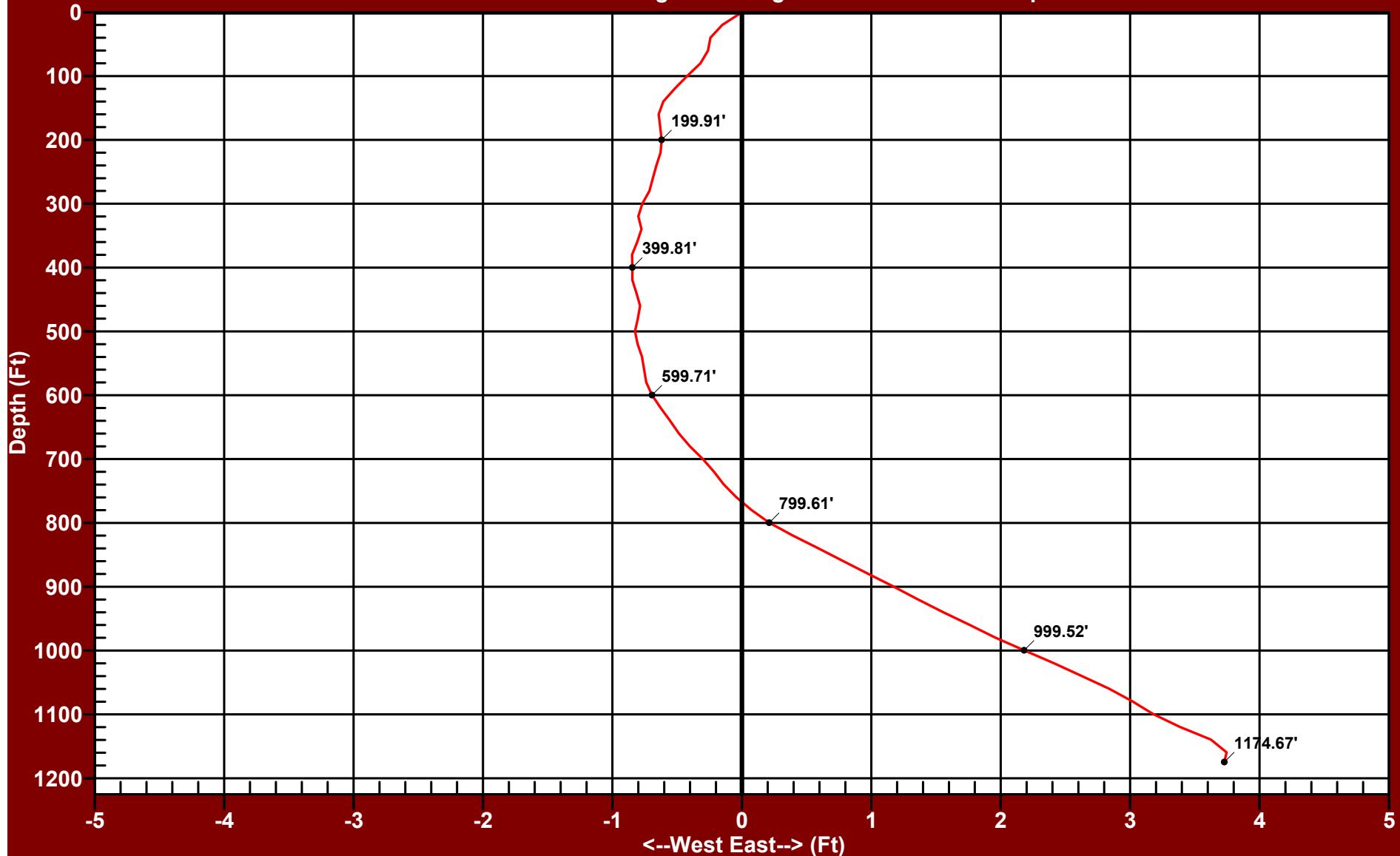
Southwest Exploration Services, LLC (480) 926-4558

# EASTING RECTANGULAR VIEW - WB-04

Florence Copper

Florence Copper

Drift Distance = 3.73 Feet      Drift Bearing = 92.9 Degrees      True Vertical Depth = 1174.67 Feet



Date of Survey: Friday - April 6, 2018

Balanced Tangential Calculation Method

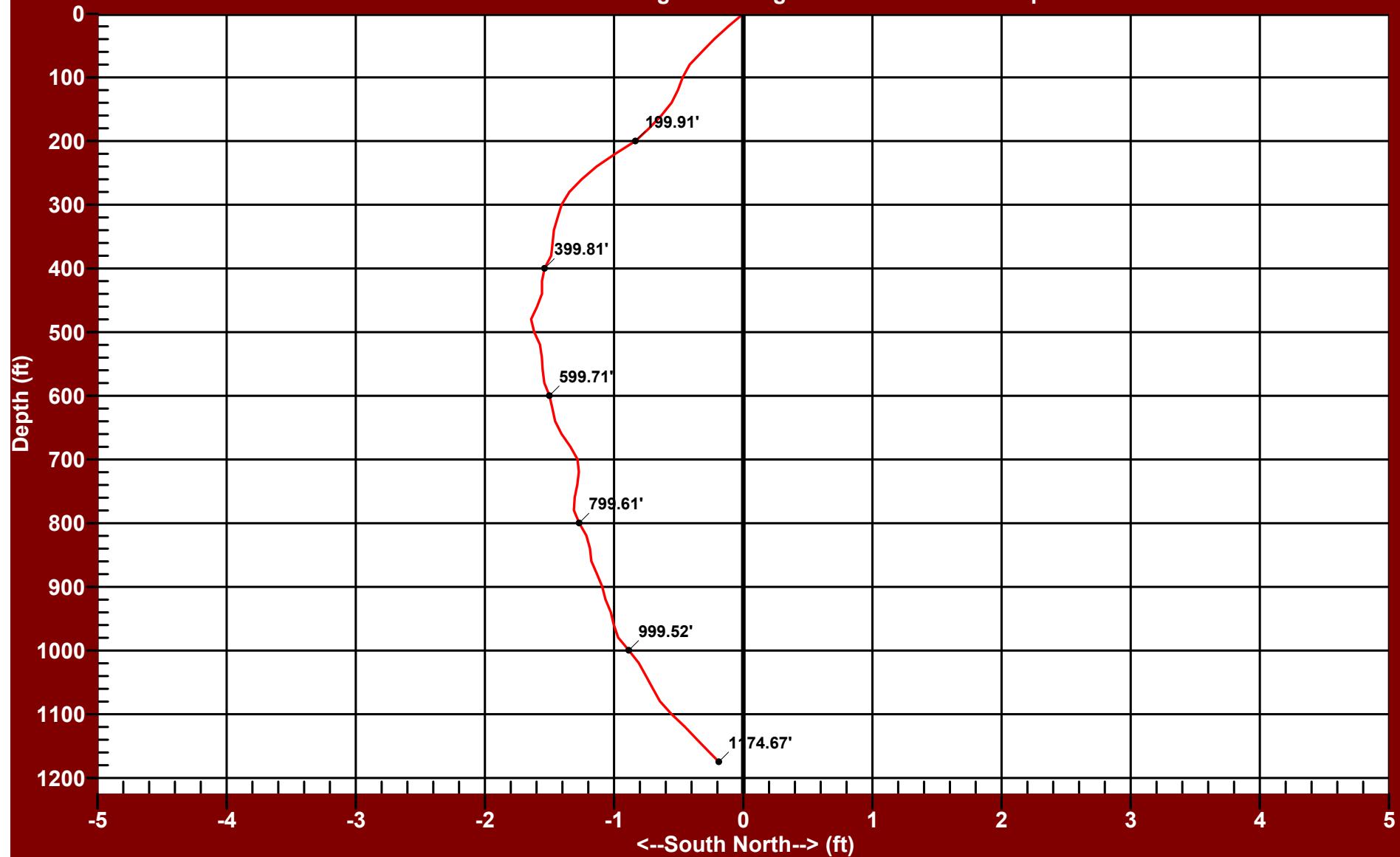
Southwest Exploration Services, LLC (480) 926-4558

# NORTHING RECTANGULAR VIEW - WB-04

Florence Copper

Florence Copper

Drift Distance = 3.73 Feet      Drift Bearing = 92.9 Degrees      True Vertical Depth = 1174.67 Feet



Date of Survey: Friday - April 6, 2018

Balanced Tangential Calculation Method

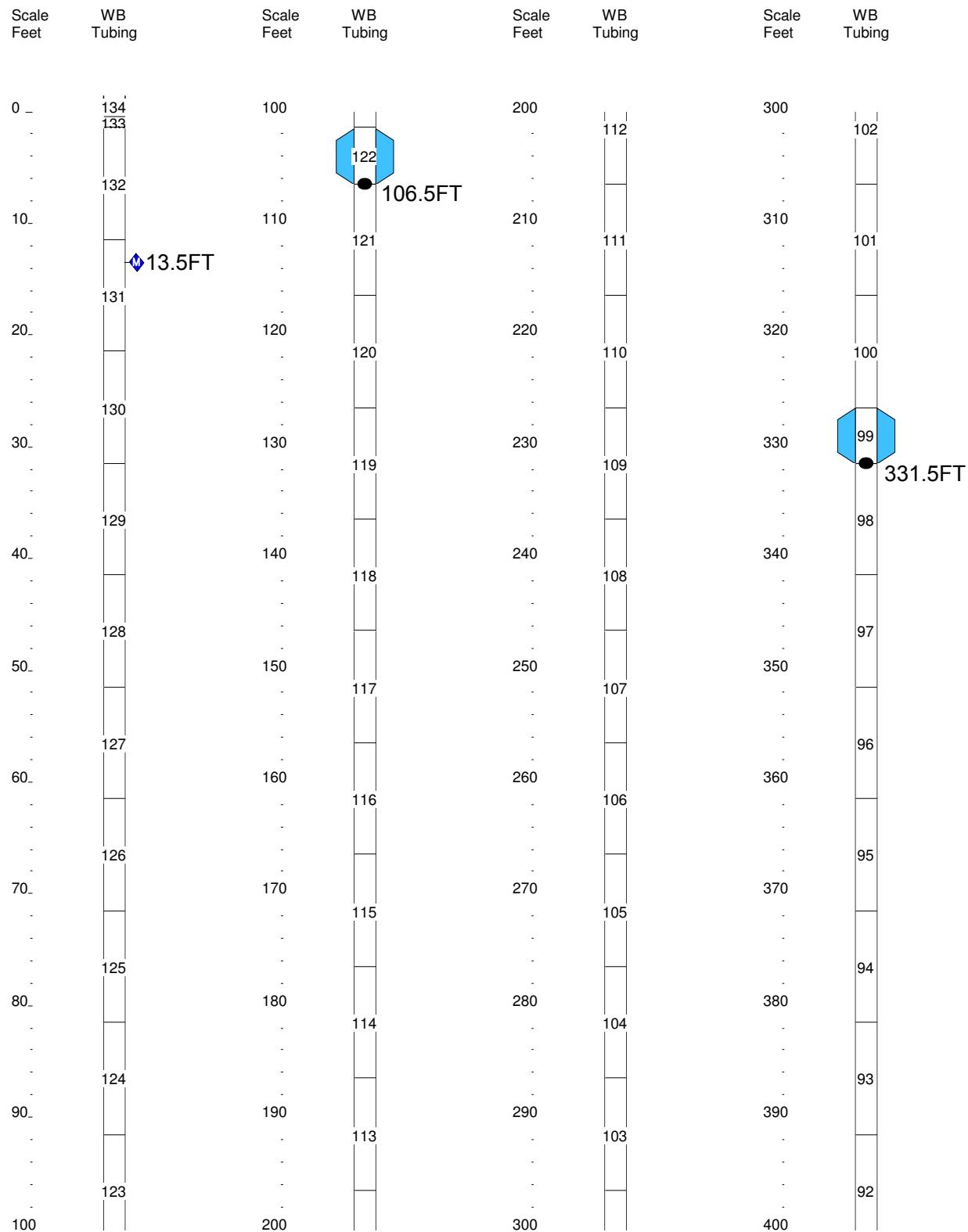
Southwest Exploration Services, LLC (480) 926-4558

**APPENDIX J**

**Downhole Equipment**

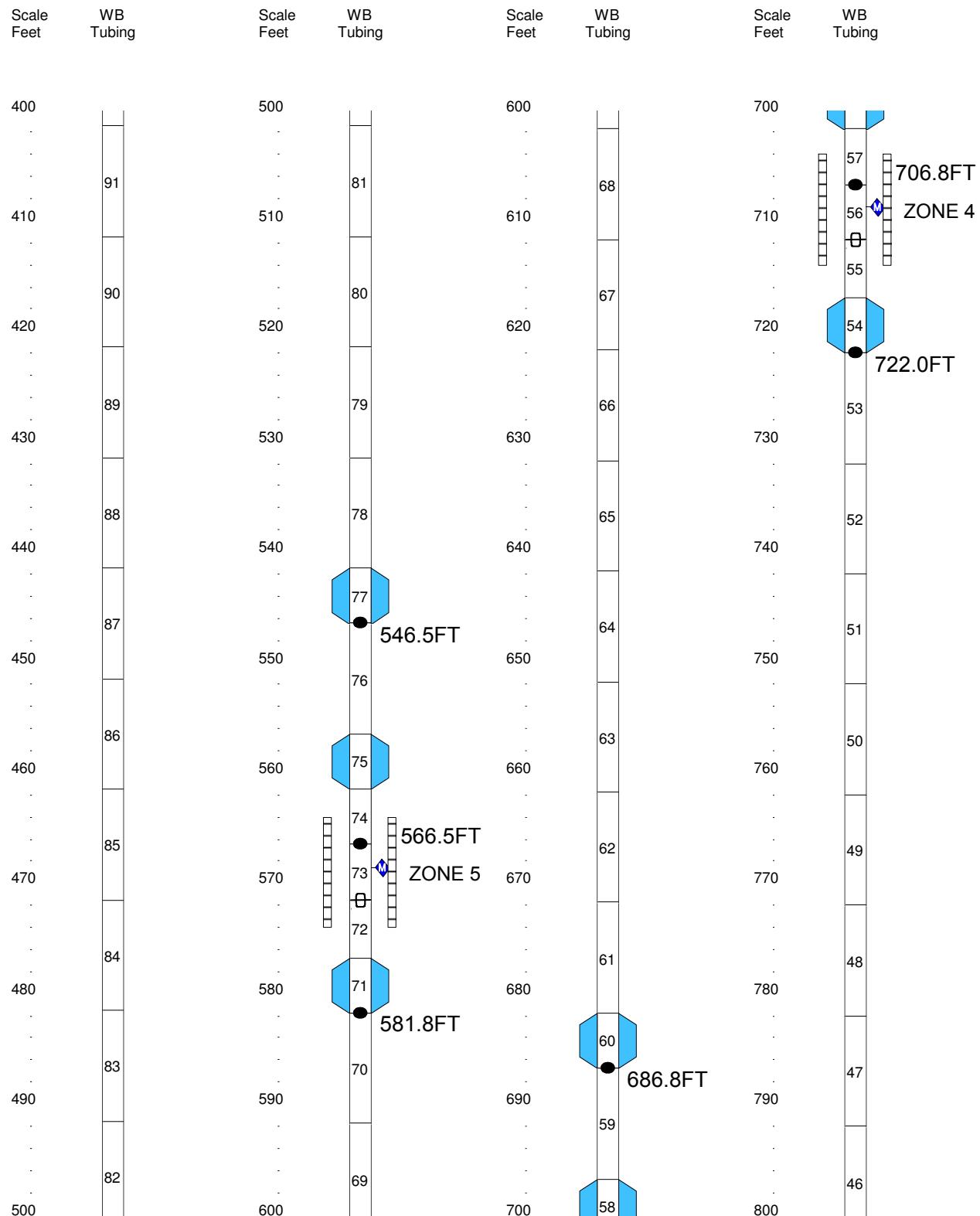
**Summary Completion Log**  
**Florence Copper Inc.**

**Job No: WB957**  
**Well: WB-04**



**Summary Completion Log**  
**Florence Copper Inc.**

**Job No: WB957**  
**Well: WB-04**



# Summary Completion Log

## Florence Copper Inc.

Job No: WB957  
Well: WB-04

